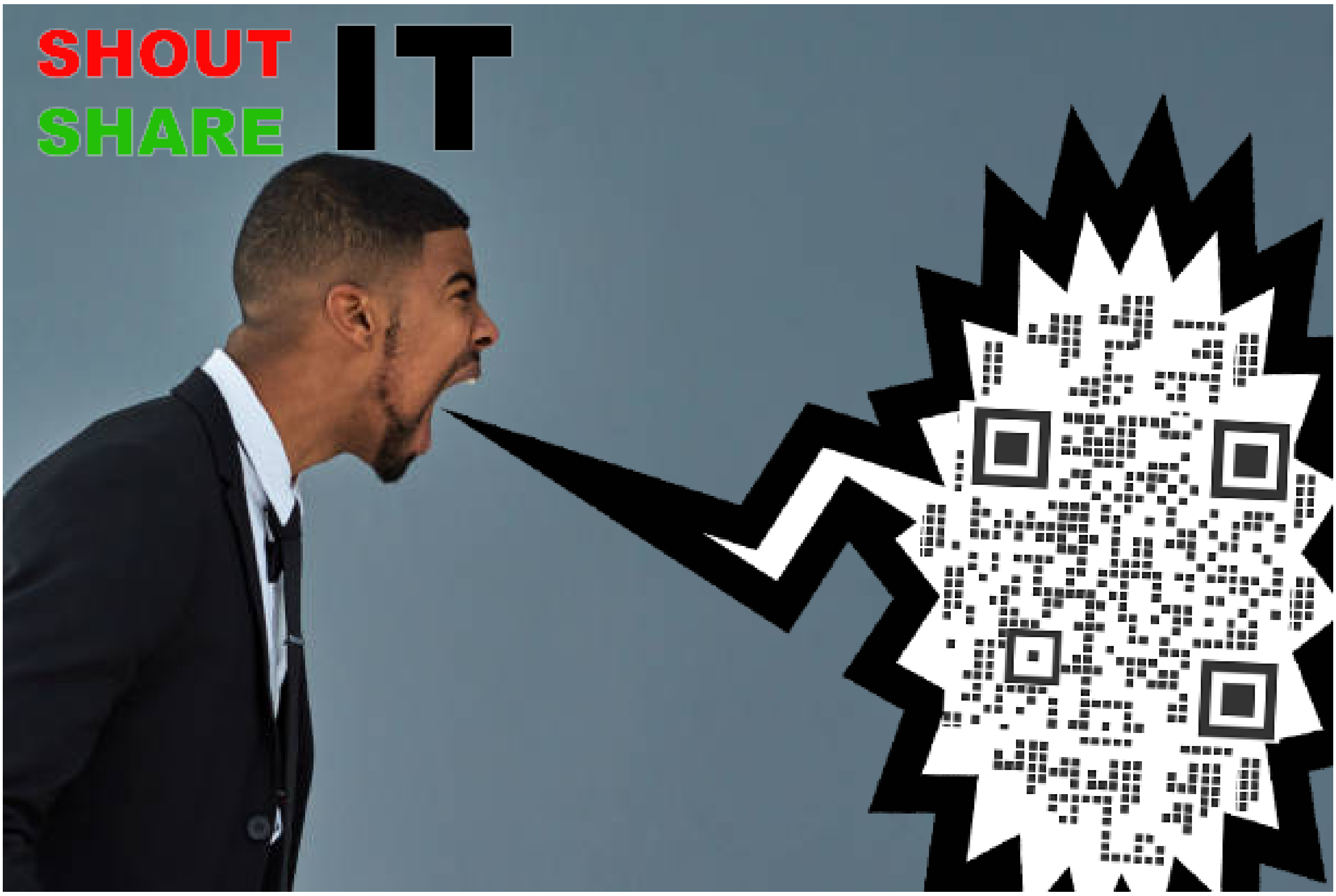

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A GENERIC REVISION OF ACHILIDAE

(HOMOPTERA; FULGOROIDEA)

WITH DESCRIPTIONS OF NEW SPECIES

R. G. FENNAH

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BY

R. G. FENNAH
Department of Agriculture
Trinidad, B.W.I.

Pp. 1–170; 119 *Text-figures*

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A GENERIC REVISION OF THE ACHILIDAE (HOMOPTERA: FULGOROIDEA) WITH DESCRIPTIONS OF NEW SPECIES

By R. G. FENNAH

DEPARTMENT OF AGRICULTURE, TRINIDAD, B.W.I.

SYNOPSIS

This paper consists of a revision of the world genera of the family Achilidae (Homoptera: Fulgoroidea). After a brief outline of the history of the systematics of the family, the morphological characters on which the present classification is based are surveyed and compared with those found in other fulgoroid families. A key to the seven tribes of Achilidae is then given, followed by descriptions of the tribes and keys to their genera. The genera are then described and discussed. Altogether 99 genera are dealt with, of which 30 are described as new, while 46 new species are described and a number of old ones redescribed. A considerable amount of synonymy is recorded and many new nomenclatorial combinations proposed.

THE family Achilidae was established by Stål (1866:130) for the reception of *Achilus* Kirby and twelve other genera. With the transference of genera from other families, and the contributions of later workers, notably Melichar, Kirkaldy, Distant, Matsumura, and Muir in the Old World and Uhler, Ball, and Metcalf in the New, the number of genera by 1938 had increased to something over sixty. In the present revision it has been found necessary to describe thirty new genera and to validate the name *Lanuvia* proposed by Stål.

In 1923 Muir (Muir, 1923) gave the first satisfactory definition of the family, which he reinforced in 1930 (Muir, 1930) after considering the dispositions of Haupt (1929), who had placed the group as a subfamily of the Cixiidae, though on the basis of characters which are not rigorous in their application. In 1938 Metcalf established two subfamilies, Apatesoninae and Achilinae, separated by the prominence of the cephalic carinae and by the carriage of the tegmina.

The present study has been based on the large collection in the British Museum, on material in the Naturhistoriska Riksmuseum, Stockholm, and on the writer's personal collection of West Indian and South American forms; the data from this material have been supplemented by notes prepared by the writer while examining species in the United States National Museum and the Museum of Comparative Zoology. The writer is deeply indebted to the authorities of the British Museum for the privilege of studying their collection, and in particular to Dr. W. E. China, Deputy Keeper of Entomology, for the assistance he has given on matters of detail too numerous to list; no less a debt is acknowledged as due to Dr. René Malaise, of the Naturhistoriska Riksmuseum, for the opportunity of studying Stål's historic types. Thanks are also tendered to Mr. E. C. Zimmerman, Curator of Entomology in the Bishop Museum, Honolulu, for his efforts in tracing certain of Kirkaldy's types, and to Dr. J. C. Bequaert, Curator of Insects in the Museum of Comparative Zoology, for supplying drawings of *Catonoides fusca* Metcalf.

A few genera have at different times been placed in this family but belong elsewhere; these include *Ambalangoda* Distant (= *Ptoleria* Stål), *Vekunta* Distant, *Kirbyana* Distant, *Melandeva* Distant, *Temesa* Melichar, *Pleroma* Melichar, *Talaloa* Distant, *Issidius* Puton, and *Taractellus* Metcalf.

The following combination of characters is given by Muir (1923, 1930) as distinctive of Achilidae: antennal flagellum not segmented, lateral ocelli outside lateral carinae of frons, lorae not visible in full view. Second post-tarsal segment relatively long. Tegmina with costal area absent, or, if present, devoid of transverse veinlets; clavus closed with united claval veins entering apex; claval veins not granulate; sutural margin extending beyond apex of clavus. Anal area of wings not reticulate. Abdomen in adult devoid of wax pores and of processes at base. Female with ovipositor incomplete. Male with pygofer flattened horizontally, medioventral process generally present and paired; genital styles large, complex.

Muir noted that in two species, the male genitalia of which he examined, the aedeagus consisted of a phallobase produced into processes and a small inner phallus. The loral character does not hold in *Myconus* and its allies, nor the absence of transverse veins in the costal area in *Pseudhelicoptera*. It would appear from the present study that his characters may be supplemented with the following:

First valvulae of ovipositor furnished with a pair of ventral lobes; the dorsal sclerotized limb with four or five teeth, the apical pair longest; third valvulae rounded or truncate distally, apical margin membranous. Bursa copulatrix simple or furnished with sclerites. Egg ellipsoidal, devoid of ornamentation, with a cluster of digitate processes at one pole.

As appears to be usual in fulgoroid families, members of the Achilidae show great differences between the extremes of bodily size. The largest species of the family, *Sevia moerens* Stål and *S. intermaculata* Stål, each 14 mm. long from head to apex of folded tegmina, are three and a half times as long as the smallest, *Haitiana nigrita* Doz. (4 mm. between the same points). The family falls naturally into seven groups, which are recognized below as tribes. All are relatively compact; the largest is that typified by *Plectoderes* and its members include the most primitive of the family.

The vertex is usually broader than long, with the anterior margin more or less angulate or convex, and the disk slightly depressed, while the median carina is frequently obsolete or incomplete; there are, however, many modifications of and departures from this basic plan. In *Sevia* and its allies and in *Aneipo* the lateral margins are foliate, a condition found also in *Pseudhelicoptera* and *Chroneba*. In several genera of the Plectoderine series the vertex is longer than broad, but very disproportionately so in *Kardopocephalus*, *Callichlamys*, *Chroneba*, *Pseudhelicoptera*, and *Remosachilus* (described below); the median carina is often complete, while in *Chroneba* it is distinctly foliate, and in *Nelidia* nearly so; in some genera, *Francesca*, *Kardopocephalus*, *Moraballia* (described below), and most markedly in *Bathycephala* (described below), the disk of the vertex is strongly depressed; in two genera, *Bunduica* and *Epiusana* (described below), supernumerary longitudinal carinae are developed. In *Aphypia* the anterior margin of the vertex is calloused, the callus being broader nearer the sides than in the middle; in *Agandecca* a somewhat similar condition is found, with the broad lateral portions of the callus slightly indented; from these a progressive excavation of the latero-apical areas of the vertex (or laterobasal of the frons) is traceable. In some genera (*Taloka, Gordiacea*) the areas are very prominent; in others (*Caristianus*) they are distinct but very minute; elsewhere (*Kempiana*) they are obsolete or scarcely indicated.

The 'frons' (the deflexed portion of the vertex between the most anterior part of the head and the fronto-clypeal suture) is generally elongate, and together with the clypeus is elongate-ovate in outline. This simple form, exemplified by *Faventilla, Elidiptera*, and *Mlanjella* (described below), may be modified: when the frons is viewed at a right angle to the plane of the distal half of the disk, its basal (or upper) margin may appear mitrate, convex, truncate, or angulately excavate, according to the form of the conventional 'vertex', lying between the actual anterior point of the head and its posterior dorsal margin; the lateral margins vary in their degree of curvature and convexity, but are fairly constant within a genus; the degree of curvature is in some measure indicated by the ratio between maximum width, which is almost invariably just below the level of the antennae, and the width at the base. In *Amblycratus, Tropiphlepsia*, and *Caffropyrrhyllis* (described below) the lateral margins are sub-parallel, and this condition is closely approached in other genera (*Sevia, Plectoderes, Aphypia, Lanuvia, Kawanda, Hemiplectoderes* [described below]); where the 'vertex' is narrowed near the anterior margin of the head, the lateral margins of the frons converge between the eyes and may be concave in this region (*Parakosalya, Paraclusivius* [described below]); in *Deferunda* the lateral margins of both frons and vertex are foliate and the former converge to meet basally, and form a cornice overhanging the basal part of the frontal disk. Foliation of the margins is general, and in most genera takes the form of lateral extension at the level of the antennae; such extension is well displayed in *Plectoderes*; occasionally the foliate carinae may be extended obliquely anteriorly (*Sevia, Ilva*) or completely anteriorly (*Breddiniola*). The disk of the frons is usually slightly convex in its basal portion and more or less flat distally (*Agandecca, Pyrrhyllis*); sometimes it is flat throughout (*Paratangia, Betatropis*), while in several genera it is concave; in *Sevia, Apateson*, and *Ilva* the concavity is striking and involves the clypeus; biconcavity in the form of longitudinal depression on each side of the middle line is widespread (*Kosalya, Lanuvia, Bathycephala*, and *Moraballia* (described below) may be cited as more extreme examples). In *Aristyllis* the middle portion of the disk in the apical half is markedly and characteristically depressed, in a manner paralleled only by *Sevia* and its allies, while depression of the disk in this area across the whole of its width occurs where the suture is impressed (*Callinesia, Parakosalya, Plectoderes*). The profile of the frons is to some extent correlated with the form of the vertex: where this is short the convexity may be considerable (*Plectoderes*); where it is long the frons may be straight throughout its length (*Epiptera, Callichlamys, Chroneba, Betatropis, Koloptera, Remosachilus* [described below]).

The clypeus is triangular, more or less flat in profile, with the disk flat or slightly convex; the margins are carinate and usually a median carina is present; variation is found in the ratio of length to maximum breadth, in that of length to the length of the frons, in the convexity or concavity of the disk, and in the angle of convergence of the lateral margins. In length relative to frons *Sevia* and *Callichlamys* illustrate the extreme contrasts in such ratios; the tumid disk is found in *Haitiana, Gordiacea,* and *Parakosalya*; the hollowed disk in *Sevia* and *Ilva* and, on each side of the median carina, in *Kosalya* and *Lanuvia*. In *Sevia* and its allies the median carina is absent, while in *Callichlamys*, *Callinesia*, and *Paratangia* it is obsolete. The clypeus of *Aristyllis* has a characteristic form, being subequilaterally triangular with the lateral margins straight or slightly concave.

The rostrum is five-segmented and usually terminates near the level of the post-coxae; the joints differ between genera in their degree of elongation (length/width) and in their relative lengths: in some genera (*Magadha*, *Hamba*) the subapical segment is markedly shorter than the apical, whereas in others (*Callichlamys*, *Pyrrhillis*) it is longer. The rostrum also varies in its total length and as in some Cixiidae it is sometimes longer in the female than the male. In the shortest form of rostrum the apex scarcely surpasses the pro-trochanters (*Deferunda*) while in the longest it surpasses the post-trochanters (*Epirama*, *Cionoderella* [described below]); the tip of the rostrum is always bluntly conical, never abruptly truncate and flattened as in Derbidae.

The sides of the head show between genera numerous subtle differences in gradations of outline, degree of obliquity, of inflation or depression, and of extension anteriorly or dorsally: many of these differences are impossible to describe succinctly or even to illustrate: the following, however, are appreciable in their more pronounced forms and are of assistance to the taxonomist. In *Myconus* and a few allied genera the loral plates, which in the Achilidae are usually set at right angles to the disk of the clypeus, are so feebly oblique as to appear almost as a lateral extension of the disk. The genae, or sides of the head below the level of the eyes, are flat or slightly hollowed out. In *Plectoderes* the considerable lateral extension of the lateral margin of the frons, and the overhanging eye, accompanied by depression of the genae, cause the antennae to be sunk in a depression; through a range of genera it is possible to trace every stage of the transition from the flat gena (*Clusivius*, *Akotropis*) to the deeply hollowed form found in *Plectoderes*. In two genera, *Koloptera* and *Remosachilus*, a horizontal carina extends from the anterior margin of the eye to the lateral margin of the frons. The form of the sides of the head above the eye depends largely on the shape of the lateral carinae of the vertex: this area is extremely narrow in *Haitiana* and *Aristyllis* and reaches its greatest extent in *Chroneba* and *Pseudhelicoptera*.

The antennae are remarkably uniform in the family: the basal joint is generally very short and ring-like, though it is distinct in *Epiptera*, and in *Rhotala* is almost as long as broad. The second joint is short and subcylindrical in *Rhotala*, *Myconus*, and *Elidiptera* and allied genera; in the remainder it is subovate or subglobose with the third joint and arista terminal, usually set in a slight depression. A noteworthy exception is found in *Haitiana*, where the second joint is cylindrical and abnormally elongate and the apex so oblique that the third joint occupies a subdorsal position. This form of antenna is unique in Achilidae, though its shape recalls that of several derbid genera.

The ocelli, always two in number, appear to be universally present; they vary slightly in position and may be widely separated from the eyes (*Betatropis*, *Chroneba*) or contiguous so as to be flattened on the side adjoining the eye (*Deferunda*, *Gordiacea*, *Catonia*). Above the ocelli is a pair of what appear to be placoid sensillae: these are not peculiar to Achilidae but are of wide occurrence in the superfamily. The eyes are usually entire, round in side view and subovate, tapering anteriorly in dorsal view. In a few genera they are ovate, being elongated in conformity with elongation of the head (*Remosachilus, Callichlamys*). In many genera they are emarginate below. Such emargination may be very slight, and indicated merely by a lack of red pigment in a small area of the eye above the antenna (*Aristyllis*); indentation of the margin (*Chroneba*) marks a further step, while the extreme condition involves distortion of the lower half of the eye; in such examples the deep excavation is accompanied by lateral bulging of the eye above it (*Taloka*).

The pronotum is convex on the anterior margin and concave posteriorly. It is longest in *Myconus* and its allies (*Epiptera, Myconellus*), where, moreover, its basal width very markedly exceeds that of the head; it is shortest in *Apateson* and *Plectoderes*, where it appears dorsally as little more than a subvertical lamina between the vertex and mesonotum; in general it is short and a little wider than the head including the eyes. A medial disk is generally present, bounded laterally by carinae, but it is obsolete in *Sevia* and *Apateson* and minute in *Pseudhelicoptera* and *Plectoderes*, while in *Myconus* its boundaries are obscure. The disk may be anteriorly convex (markedly so in *Rhotala*) or truncate (*Caristianus, Kosalya, Prosagandecca* [described below]); a median carina is usually present, except in *Elidiptera* and its allies. The lateral carinae of the disk diverge posteriorly and exceed the length of the median carina, usually they pass to the hind margin, though not in *Elidiptera* and allied genera and in those Plectoderine forms in which they are concave and curve laterad at their basal extremities. A complete series of intergradations exists in the latter group between the extreme forms that these carinae can assume, as found in *Salemina* and *Bathycephala*. The areas lying behind the eyes between the disk and the lateral margin show marked variation between genera. In *Rhotala*, myconine, elidipterine, and achiline genera they are broad and gently inclined laterad, in *Apateson* and its allies and in *Plectoderes* they are reduced to the hind margin of a subvertical plate. The average pronotum in this region comprises a subvertical portion lying immediately below the postero-lateral field of the head behind and beneath the eye, and an exposed dorsal field sloping laterad gently downward to the lateral margin: this dorsal area may be subhorizontal in an axial direction, and bounded sharply, subcarinately, against the hind margin of the eye (*Haitiana, Rupex* [described below]); in this condition it may be smooth (*Aristyllis*) or indented with two or three shallow impressions: these in their extreme form are subrectangulate and the ridges which divide them form subparallel carinae passing from the anterior to the posterior margin. This relatively horizontal dorsal field may compactly occupy the whole area between the eye and mesonotum, or it may be more or less reduced in width (*Deferunda, Betatropis, Catonia*) until it disappears (*Paragandecca, Plectoderes*). Genera in which it is not developed have this area of the pronotum inclined anteroventrad, that is, shelving from the hind margin forward and downward under the eyes. The lateral margins, long in *Myconus* and extremely short in *Plectoderes*, may be smooth, unicarinate, or bicarinate; in *Breddiniola* and *Breddiniolella* a deep circular fovea is developed on the lateral margin, and the carina passes round its rim. Below the lateral margins the pronotum is bent downward and twisted to face forward, and the shape of the lobes so formed ('lateral ventral lobes of pronotum') recalls that of saddle-flaps. These lobes show little variation, but differ in relative size and more noticeably in the shape of their lower margin. This, when the insect is viewed from the front, may be straight and horizontal (*Achilus*), or rounded (*Caffropyrrhyllis* [described below]), or more or less oblique; the lower outer angle of the lobe may move mesad and become acute, and the ventral margin which lies mesad of it become exceptionally oblique. The posterior border of the pronotum is more or less emarginate, in *Myconus* the degree of concavity is very slight, but in some genera (*Kosalya, Kempiana, Betatropis, Remosachilus*) the excavation may be rectangulate or acute.

The mesonotum is generally slightly broader than long and more or less distinctly tricarinate. It attains its relatively greatest size in *Myconus* and its allies and its least in plectoderine forms such as *Remosachilus*; it is usually about twice as long as the vertex and pronotum combined. The carinae may be obscure (*Elidiptera*); the lateral carinae may be subparallel or diverge basally, but in *Sevia*, *Apateson*, and allied genera they are convex and enclose an ovate disk. In *Caristianus* the hind portion of the disk is slightly depressed, while in *Kempiana* the anterior part of the disk and the lateral areas outside the disk have a markedly different texture from the posterior: the contrasting areas are separated by a feeble transverse ridge. The tegulae are moderately large and bent through almost a right angle; in some genera a carina is developed along the line of flexure. The legs present no abnormal features in this family. In some genera the pro-tibiae are longer than the pro-femora and trochanters, while in others, including most of the plectoderine forms, they are slightly shorter. The post-tibiae are almost invariably armed. In almost all plectoderine genera a single spine is present in the basal half, but in *Kosalya* there are two. The unarmed condition of the post-tibiae is so exceptional that its reported existence requires confirmation. *Rhotala* is exceptional in the family in having seven post-tibial spines. The second joint of the post-tarsus in *Achilus* is relatively long, much longer than broad, while the pre-tarsus has a well-developed areoleum and a pair of large dorsal sclerites.

The tegmina vary in relative size, proportions, outline, texture, and venation. In most genera they are carried 'horizontally', that is, with the sutural margins closely overlying the tergites of the abdomen and the membrane deflexed to overlap its counterpart beyond the end of the body, thus giving the insect a rather flattened appearance. In *Apateson*, *Sevia*, and their allies the tegmina are carried more steeply, though in some species of the subgenus *Ateson* the membrane may overlap distally. In general the tegmina are about three times as long as wide at the widest part; in *Aphypia longipennis* the ratio is 3·2:1, while in *Haitiana* it is 2·8:1. The costal margin is very slightly convex. The apical margin is rounded or rounded-truncate; in *Apateson* it is incised in M. This condition is found in certain Dictyopharidae (*Raphiophora*), but nowhere else in Achilidae. The sutural margin is obtusely angulate beyond the apex of the clavus. The clavus is distally truncate and the united claval veins (PCu+A1) enter its apex. The claval suture is sometimes traceable into cell Cu1b as a fold. The costal vein generally lies along the anterior margin. In some species of *Sevia*, however, and in *Kempiana* a distinct area is developed before the costa, and in its basal portion may be relatively broad; in *Pseudhelicoptera* a costal area is developed which is traversed by numerous transverse bars. In some genera (*Catonia*) such separation of the costal vein from the margin may be seen in an incipient form near the base. The subcostal, radial, and median veins usually emerge in a common stalk from the small basal cell; M separates near the base while Sc and R fork approximately level with the fork of Cu1. The relative positions vary in minor degree between genera, species, and even individual specimens in a series; in *Opsiplanon* and *Necho* the position at which Sc separates from R is unusual in that the subcostal vein is united to the radial almost as far as the node. The apical portion of Sc is a region of venal instability: in its simplest form the vein forks distally and one branch passes to the margin at the node (the anterior end of the line of flexure of the membrane) and forms the basal boundary of the stigmal cell; the other branch bounds the stigmal cell on its lower side then forks and sends two branches to the margin, the anterior of which bounds the stigmal cell on its distal side: this arrangement is frequently modified by the number of branches to the margin in the stigmal area or distad of it being increased (five in *Ilva* and *Plectoderes*, six in *Kosalya*); alternatively the distal portion of the vein may retain its original number of branches but become distorted and partly coalesce with R (*Deferunda, Koloptera*); in tegmina with this modification a callus may form at the apex of the costal cell adjoining the nodal line (*Deferunda*), or in the stigmal and adjoining cell (*Koloptera*). The radial vein is two- or three-branched distally (R1+2, Rs or R1, R2, Rs) and the first fork occurs level with the node. M forks at the same level and usually gives off three branches to the margin (M1, M2, M3+4). In *Sevia* and *Myconus* and its allies the number of apical branches is considerably more. In *Elidiptera* and some of its allies marked distortion is found in the distal portion of M and a callus is developed in one or more of the subapical areoles, while a small narrowly rectangular cell, probably of mechanical importance, is often developed in Cu near the callus in M. Both specializations have apparently been evolved to meet the stresses created by the folding of the membrane. The cubital vein emerges from the lower distal angle of the basal cell and forks before the level of the apex of the clavus, usually level with or a little distad of the union of the claval veins. Both branches are generally simple to the apex, though in a few genera (*Elidiptera, Mabira* [described below], *Myconus, Sevia*) they may become divided into several veinlets before reaching the margin. The posterior branch of Cu is usually slightly convex beyond the apex of the clavus and basad of the first transverse vein, but in the genera *Koloptera, Deferunda, Haitiana, Taloka,* and *Gordiacea* it is abruptly and strongly convex. In these genera R, M, and both branches of Cu converge to a small area near the middle of a line between the node and the claval apex; sometimes, as in *Koloptera,* there is a distinct transverse fold where the nodal line adjoins the costal margin. Apart from the node itself and the apex of the open clavus, the nodal line, which separates corium from membrane, is marked only by the R–M and M–Cu cross veins; a complete subapical line of transverse veins passes from the stigma to the sutural margin distad of the apex of the clavus: it is somewhat irregular, but well defined, and its degree of curvature is usually midway between that of the nodal line and that of the apical margin. The clavus is very uniform throughout the group, and the claval veins unite distad of its middle. Some variation occurs in its length relative to that of the whole tegmen, with the result that in some genera (*Haitiana*) it extends for much more than half the length of the tegmen, while in others (*Parakosalya*) it terminates basad of the middle.

The tegmina are usually of a sober hue with brown, sepia, or deep fuscous predominating; colour is not lacking in the family, however, and *Achilus flammeus* Kirby and *Aneipo diva* Kirk. rank among the gaudiest of homoptera. In almost all genera the corium is opaque and the membrane subopaque: in *Myconus*, *Elidiptera*, and various plectoderine genera (*Catonia*) both exhibit a moderate degree of translucence, while if *Calerda* is rightly placed in this family it offers a unique example of hyaline transparency. The texture of the corium and membrane may be smooth (*Plectoderes*) or granulate (*Rupex*). In *Tropiphlepsia* and *Rupex* (described below), vertical lenticular flanges are developed on the upper surface of the tegmen on M, Cu, and the hind claval veins; striking though this may appear in its maximal development, the initial stages of the development of such flanges may be seen in *Catonia*. In all genera a short stout flange is similarly developed on the lower surface near the basal cell, as in other Fulgoroidea. In some genera prominent granules are present alternated on each side of the veins (*Opsiplanon*); this sometimes occurs in an accentuated form with the development of short peg-like outgrowths from the veins into the membrane.

Wings are universally present and are rather larger than the tegmina. The margin is entire; Sc is usually simple, but six-branched in *Myconus*; R is usually two- or three-branched; M is generally two-branched, Cu1 three-branched, Cu1b simple, PCu is simple, and A1 two-branched. The wings are usually translucent, powdered white, fuscous, or smoky.

The abdomen is relatively short and depressed so as to appear transversely ovate in section. The sclerites are strongly pigmented brown. A pair of rectangular sclerites lies on each side between the tergite and the ventrite of segments 3 to 8. On the tergites of segments 6, 7, and 8 a pale transverse oval scar is visible: this on the inner wall appears as a short peg-like outgrowth. In the female all the tergites are transverse, but in the male those of segments 6 to 8 may be markedly V-shaped cephalad.

The pregenital sternite in the female is usually transverse posteriorly: it may be slightly produced on each side of the middle line, and in *Rhotala* is greatly enlarged while its hind margin is elongately triangular. Some slight variation may occur within the limits of a genus. Slight changes in form and angularity may also occur in the lower part of the hind margin of the lateral margin of the eighth segment (*Ballomarius*).

The anal segment is usually short and rounded in both sexes; it is elongate in the male of *Rhotala*, *Myconus*, and species of *Plectoderes*. In the female it may be extremely short (*Elidiptera* and allied genera), when it consists of a narrow ring distinctly produced at the latero-ventral angles into finger-like setigerous lobes: in such cases the telson is prominently developed. The pygofer is ring-like: it is normally produced into a short process in the middle of the hind ventral margin: the process may be entire and convex (*Spino*, described below), triangular (*Hemiplectoderes*, described below), elongate (*Elidiptera*), bifid (*Plectoderes*, *Catonia sobrina* Fowler), or in the form of two separate sclerites free from the margin of the pygofer (*Rhotala*). The external male genitalia, while differing markedly in trivial ornamentation, are uniform in pattern: the phallobase is a broad submembranous tube with certain areas sclerotized; the phallus is reduced to a sclerotized ring around the external opening of the genital duct, with a pair of long subequal strip-like appendages which are usually minutely shagreened at the apex; in *Rhotala* these processes are minute, while the phallus takes the form of a short, hollow, membranous cone or 'vesica'. The harpagones, or genital styles, are relatively large, narrow basally and irregularly expanded distally: their inner ventral margins are straight and apposed when at rest; the dorsal margins are produced into an eminence at the middle, while a vertical or curved spine may be present on the inner face near the base. A transverse bar connects the harpagones, and from its mid-point a long arcuate rod or tube extends to the apex of the ductus ejaculatorius.

The external female genitalia conform to a basic pattern, and except in *Rhotala* are of broadly similar appearance. The membrane between the pregenital sternite and the external orifice of the vagina is sclerotized, usually in a moderately broad transverse plate, the *subvaginal plate*. Each of the first valvulae is made up of a small, pigmented, rather thick subtriangular lobe which lies ventrally, the *ventral lobe*, and a sclerotized horizontal limb bearing three to five teeth: in most genera the teeth are stout, triangular or spinose; in *Rhotala* they are distally bifid, crenate, while about six narrow fimbriate lobes are also present. The second valvulae are membranous, and taper distally to a sudden dilation near the apex: each valvula is supported by two narrow sclerotized rods. The third valvulae are usually a little longer than broad, stout and deeply pigmented, a horizontal membranous lobe is present dorso-mesally, and the apical margin of the sclerotized lateral part of the valvulae is also narrowly membranous. In *Rhotala* the third valvulae are relatively long.

The internal genitalia of the male (Fig. 103, *m, n*) comprise paired testes situated above the eighth abdominal sternite. Each testis (*Tes*) consists of six spermatic tubules (*Spt*) in the genera examined (*Catonia, Amblycratus*), each of which is connected by a very short vas efferens (*Ve*) to the vas deferens (*Vd*). The vas deferens terminates in a knot of tight coils, apparently an epididymis (*Ep*), distad of which the duct widens to form a vesicula seminalis (*Vs*). The vesiculae seminales unite at the base of the ductus ejaculatorius (*Dej*), which at the same point receives the ducts of a pair of accessory glands (*AcGl*). In *Catonia* each accessory gland is greatly elongate and consists of a long tube filled at the apex with densely granular cells; these are replaced distally by clear highly refractive cells.[1] The distal portion of the tube is hollow and is filled only with secretion from the preceding. This secretion hardens in alcohol and readily takes up acid fuchsin.

The ovaries are paired and in *Catonia* each is made up of six ovarioles. The ducts of the ovarioles are united at their lower ends to form an oviduct and the two oviducts meet immediately before entering a broad thin-walled chamber (Fig. 107) which represents the inner end of the vagina. Close to their point of entry a large-mouthed sac, the bursa copulatrix (*Bc*), opens into the common chamber at the end of the vagina, while the long and relatively complex spermatheca (*Spt*) opens on to the chamber on the opposite side. The apex of an ovariole is shown in Fig. 103, *o*. The spermatheca varies in detail but little in gross structure. At its inner end is a small, slender subfusiform tube (1) with delicate spiral folding: this narrows at its lower end, and enters very abruptly on to a wider tube, with regular transverse constrictions: this tube in turn narrows and becomes thick-walled and densely invested with what appear to be circular muscle-fibres (2): near the genital chamber the spermatheca is broad and thin-walled. The bursa copulatrix is a pouch of ectodermal origin: its shape varies between genera. Its general surface is uniformly beset with minute sclerotized rings, either thick-walled or thin-walled (103, *k*; 107, *i*) each bearing six or more tubercles. The wall of the bursa within each ring is extremely thin. The haemocoelic surface of the bursa appears to be densely coated with muscle-fibres. The minute surface ornamentation may include less definite elements such as alternating papillate and fimbriate projections (28, *g*), or short rows of tubercles (*Amblycratus*). In addition to these the bursa may bear a sclerotized plate, armed with one or more spines directed obliquely into the lumen of the bursa. The spine is single in some genera (*Bathycephala*), while many are present in the *sobrina* group of *Catonia*; in *Plectoderes* they take the form of a shagreened covering to the plate. Independently of the presence of such a sclerite, the entrance to the bursa may be armed with one or two sclerites, one of them usually bearing a spine, and occasionally both spinose (*Mlanjella*, described below).

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[1] This refers to fixed material.

The nymphs of *Catonia* and *Epiptera* are similar to the adult in general form, though lacking the more bizarre specialization. The sides of the frons are beset with two rows of pits, probably secretory. Similar pits are present on the prothorax. Small groups of wax glands open near the base of the anterior wing pads, while large aggregations of wax glands occur laterally on abdominal segments 6, 7, and 8. The post-tibiae are unarmed. The dorsolateral processes of the ninth segment (see Fennah, 1945, *Proc. Ent. Soc. Wash.* **47**:220) are short and distally crenulate, as in the delphacid *Peregrinus*. The nymphs are brown, powdered with grey.

The eggs are ellipsoidal, twice as long as broad, and devoid of surface ornamentation except at one pole, where about sixteen finger-like chorionic processes (Fig. 107, *h*) are closely aggregated to form a short peg-like eminence.

Points of fundamental interest in the morphology of the genera are to be found in the evidence of parallel evolution, the direction of specialization within the group, and the evidence of affinity with other families.

No attempt is made here to list all the characters which outcrop repeatedly, and presumably indicate the presence of a common group of genes. A few of the more obvious are given below, with some of the genera in which they occur: vertex with triangular areolets at latero-apical angles (*Catonia*, *Cythna*, *Hamba*, *Taloka*, *Nephelia*, *Usana*, *Gordiacea*, *Magadha*, *Callinesia*); pronotum with impressions and supernumerary ridges between the disk and lateral margins (*Catonia*, *Opsiplanon*, *Cnidus*, *Necho*, *Koloptera*, *Haitiana*, *Taloka*, *Gordiacea*, *Betatropis*, *Rupex* [described below]); tegmina with R, M, and Cu approximated at nodal line, Cu1b strongly convex between claval apex and transverse vein (*Koloptera*, *Haitiana*, *Taloka*, *Gordiacea*, *Deferunda*); entrance to bursa copulatrix with a three-armed sclerite (*Elidiptera*, *Paraphradmon* [described below], *Kawanda*, *Epiusana*, *Cionoderella*, *Remosachilus*, *Paragandecca, Mlanjella, Ballomarius, Kurandella, Lanuvia, Bathycephala, Moraballia*); dark tegmina flecked with pale green (*Sevia, Catonia*). It is of interest also to note the examples of convergent evolution between Achilidae and Derbidae. Both lay simple eggs, and the nymphal life is spent under bark or inside cavities in dead wood. In *Rhotala* the pregenital sternite of the female has assumed almost exactly the shape of that found in *Derbe* F., while the valvulae of the ovipositor have become modified into an approximation of the form of those of *Derbe*. In these two families the male genitalia have undergone considerable specialization, though not in the same manner. The granules along the tegminal veins in some genera would seem to correspond with those developed at the base of setae on the veins of certain Cixiidae (*Mnemosyne*). The sulphur-yellow and purple-black colour of *Plectoderes* is curiously similar to that of *Bothriocera cyanea* Fennah both in hue and pattern.

The Achilidae, on evidence so far obtained, belong to a group which includes Achilixiidae, Meenoplidae, and Kinnaridae. The fundamental characters shared by this group are: (1) a simple egg, (2) a cryptic nymphal life, (3) a reduced or obsolete ovipositor, (4) a tubular phallobase and a greatly reduced or obsolete phallus, (5) a long second post-tarsal joint, (6) a rostrum with a long apical segment, (7) a primitive tegminal venation (except in a few very specialized genera). The Kinnaridae have wax-bearing glands on the sixth, seventh, and eighth abdominal tergites, or on two of these: wax glands are present in this position in the nymphs of Kinnaridae and Achilidae and probably in those of the other families as well. The clavus is open in Achilixiidae as well as in Achilidae; in these two families the united claval vein enters the apex of the clavus; in Kinnaridae and Meenoplidae this vein enters the commissure, though narrowly so in the latter. The shape of the head of a typical prosotropine Kinnarid (*Quilessa*) is approximated in *Parakosalya*.

The form of the frons of *Breddiniola* is remarkably like that of a Meenoplid, though the median ocellus is of course lacking. The first valvulae of the ovipositor in Achilixiidae have ventral lobes, and the sclerotized limb a few teeth as found in Achilidae. The achilid pronotum, in all its forms except that with supernumerary ridges, may be compared with similar patterns in Achilixiidae, Kinnaridae, or Meenoplidae. While these four families form a natural group, it is remarkable how some of their lines of development exactly parallel those found in Derbidae.

The Achilidae are of world-wide distribution in the temperate and tropical zones, but reach their maximum development in the latter. According to the interpretation of genera given below, no tropical genus is common to both eastern and western hemispheres with the exception of *Rhotala*, which occurs in the East Indies and Central America.

In classifying the family the writer has found that genera fall into seven well-defined groups, here recognized as tribes (Rhotalini, Plectoderini, Myconini, Breddiniolini, Elidipterini, Achilini, Apatesonini), separated as shown in the key given below.

Of these, the Plectoderini form the largest group and its members include the smallest and most primitive of the Achilidae: it is also the most widely dispersed, although, curiously, no plectoderine has been recorded in Europe. The Myconini are predominantly composed of New World genera, and *Cixidia* (Europe) is the only endemic Old World representative while *Epiptera* is apparently holarctic. The two genera of Breddiniolini are known only from West Africa and Fiji. The Elidipterini are almost entirely New World; *Mabira* and *Katbergella* (described below) are African, and *Neomenocria* (proposed below) European; similarly the Apatesonini occur in the New World, with *Ilva* (West Africa) as the only Old World representative. The Achilini are almost exclusively Old World and mostly found in Australia and Indonesia: American representatives include only the Neotropical *Nelidia* and *Flatachilus* (described below). The Rhotalini include only the aberrant *Rhotala*. The last tribe stands well apart from the others, not only in the extraordinary (though not fundamental) modifications of the genitalia of both sexes, but in the presence, or at least indication, of lateral sulci on the frons (a nymphal structure), in the greatly developed pronotal disk, and the flattened mesonotal disk devoid of a median carina, as well as in the seven-spined condition of the post-tibiae.

In compiling the keys to the genera of each tribe, the writer encountered serious difficulty only in the Plectoderini. In this compact group the intergradation between characters well contrasted at the extremes of their development means that at some dichotomies in the key there is a small group of genera which could be assigned to either alternative with equal justification. To meet this difficulty the writer has inserted genera twice in the key where it has appeared desirable to do so.

KEY TO THE TRIBES OF ACHILIDAE

1 (2) Width of vertex not two-thirds width of pronotum 3

2 (1) Width of vertex at least two-thirds width of pronotum . . . 11

3 (4) Hind wing markedly notched at Cu2; seventh abdominal sternite of female elongate, medioventral process of pygofer paired and detached; post-tibiae six-spined . . . . **Rhotalini**

4 (3) Hind wing and genitalia not as above; post-tibiae not more than four-spined 5

5 (6) Lateral pieces of clypeus forming almost one plane with disk; disk of pronotum not elevated, two straight carinae between each eye and tegula; post-tibiae two- or three-spined . . . . . . **Myconini**

6 (5) Lateral pieces of clypeus not as above; disk of pronotum elevated, or pronotum steeply inclined; a single marginal carina on pronotum between eye and tegula, or none; if two, they are curved 7

7 (8) Venation of tegmina irregular distally in M and Cu, often with a dark callosity in M, apical margin usually deeply rounded . **Elidipterini**

8 (7) Venation of tegmina regular, apical veinlets numerous, no callosity developed in M, apical margin shallowly rounded or subtruncate . 9

9 (10) Lateral marginal carinae of pronotum rounded to enclose a circular pit; Sc and R in tegmina separate from base; eyes excavate posteriorly **Breddiniolini**

10 (9) Lateral carinae not as above, sometimes obscure; Sc and R united in common stalk basally . . . . **Achilini**

11 (12) Sc in tegmen usually with a long anterior branch obliquely bounding costal cell distally, tegmina tectiform, apically sinuate or subtruncate, vertex with anterior margin truncate or concave . . . **Apatesonini**

12 (11) Sc with anterior branch short, often recurved, tegmina shallowly rounded over dorsum when folded, apical margin strongly convex, vertex usually with anterior margin rounded or angulately produced at middle **Plectoderini**

TRIBE RHOTALINI

Head about half as wide as pronotum; pronotum elongate, three-quarters length of mesonotum; mesonotal disk flat, ecarinate medially, apical veinlets numerous, parallel. Female with seventh abdominal sternite greatly produced caudad. Male with medioventral process of pygofer paired, free from hind margin.

This tribe includes only the genus *Rhotala* Walker (haplotype *R. delineata* Walker) with about thirteen species in eastern Asia and one (*ambigua* Fowl.) in Central America. Dissections were made of the genitalia of paratypes of *ambigua* in the British Museum, and their structure was compared with that of Oriental species. It was found that *ambigua* does not stand apart from Asiatic members of the genus: in general appearance and in the genitalia of the female it is close to *delineata* Walker, while in the shape of the frons it agrees with *nebulosa* Distant.

Errada Walker, 1870 (haplotype *E. funesta* Walker) is a synonym of *Rhotala*.

Rhotala ambigua Fowler

(FIGS. 1, 2)

1905. *Rhotala ambigua* Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**:138.

Anal segment of male elongate. Pygofer with two sinuate processes on each side, medioventral process paired, bounded basally by a transverse area of membrane.

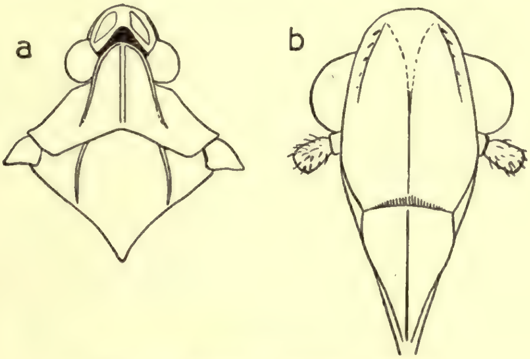

FIG. 1. *Rhotala ambigua* Fowler.
a, Head and thorax, dorsal view; *b*, frons and clypeus.

Phallobase tubular with three curved ribbon-like tapering processes on each side; aedeagus represented only by a conical vesica and a small oblique leaf-like plate on each side of it at base. Genital styles rather narrow, angulate, with a stout tooth directed dorsad.

Anal segment of female short, oval. Seventh abdominal sternite large, elongate-triangular, scoop-like. First valvulae sclerotized on upper margin with minute spines, lower margin deeply fimbriate, lobe slender, setose; second valvulae long, slender, tapering, setose; third valvulae very narrow and elongate, the dorsal lobe of each laciniate, setose.

The female genitalia show remarkably convergent development with those of *Derbe* F. (Derbidae). In the male the lack of sclerotization of the hind margin of the pygofer is apparently unique. The partial liberation of the paired sclerites of the ventral process resulting from this de-sclerotization illustrates what must have occurred in the early development of Auchenorhyncha when the primitive appendages of the ninth segment, the genital styles, acquired flexibility along the line of junction with the pygofer.

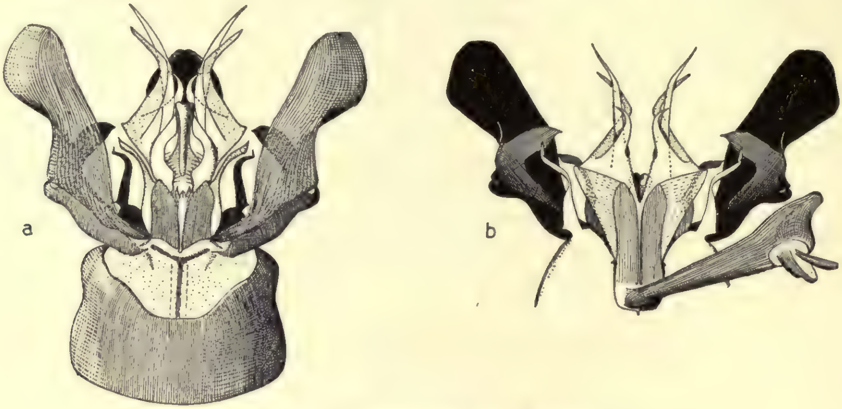

FIG. 2. *Rhotala ambigua* Fowler.
a, male genitalia, ventral view; *b*, same, dorsal view.

The transverse strut which interconnects the genital styles has not separated from the ninth sternum. The arms which provide attachment for the muscles at the base of the genital styles are thin and relatively small, but it is evident that mating occurs in the normal manner, with the third valvula of each side locked between the medio-ventral process and the genital style basad of the stout tooth; the male anal segment is thrust downward (the male being upside down) by the tip of the seventh sternite, with the curved sides of which the lateral processes of the pygofer may accidentally engage. These, like the spinose processes on the phallobase, are uncontrollable and almost certainly devoid of any definite function.

TRIBE MYCONINI

Head scarcely two-thirds as wide as pronotum, frons not elongate, median carina distinct on mesonotum, tegmina with regular venation and usually many apical veinlets, apical areoles rather long, two complete carinae between eye and tegula on each side. Pro-tibiae longer than pro-femora with trochanters. Members of this tribe are of a more or less uniform brown colouration.

KEY TO GENERA OF MYCONINI

1 (2) Lateral margins of frons subparallel, not distinctly ampliate below eyes, clypeus convex, tegmina with M four-branched . *Myconellus* gen. n.
2 (1) Lateral margins of frons diverging distally, ampliate below eyes, clypeus almost flat, tegmina with M not four-branched 3
3 (4) Vertex hollowed out, median carina feeble or absent, mesonotum quinquecarinate, if only feebly so, tegmina with M three-branched *Cixidia* Fieb.
4 (3) Vertex not as above, usually medially carinate 5
5 (6) Sides of clypeus forming an angle with disk; dorsal lateral marginal carina of pronotum much stronger than ventral . . . *Epiptera* Metc.
6 (5) Sides of clypeus shallowly rounded into disk, almost in same plane; dorsal lateral carina of pronotum not stronger than ventral . *Myconus* Stål

MYCONUS Stål

1862. *Myconus* Stål, Bidrag Rio Janeiro-trakt. Hemipt. fauna, **2**, *K. svenska Vetensk. Akad. Handl.* **3**(6): 65.

Haplotype, *Achilus conspersinervis* Stål.

Myconus conspersinervis Stål

(FIG. 3)

1862. *Achilus conspersinervis* Stål, loc. cit.: 3.

Male: length, 9·5 mm.; tegmen, 11·0 mm.

Wings with Sc six-branched at margin, R three-branched, M three-branched.

Anal segment of male long, narrow, evenly rounded at apex to a minute sharply deflexed peg medially. Aedeagus in ventral view with a long straight spine arising laterally near base directed caudad, a long vertical plate on each side with its dorsal margin straight, ventral margin tapering towards it distally, sharply bent to meet it at apex; middle portion tubular, a spine on each side at apex curved downward, mesad and anteriorly; median ventral plate terminating acutely at apex. Genital styles in profile narrowly subovate, a long stout process arising near middle on inner face near dorsal margin, curved posteriorly, swollen and bearing three spines, one directed mesad-caudad, one caudad, and one cephalad; a small auriculate sclerotization on an eminence near base of dorsal margin.

Redescribed from one male taken at Tijuco Preto, Espiritu Santo, Brazil, in collection of British Museum (Natural History). This specimen was compared with Stål's type.

Myconus trivittatus sp. n.

(FIG. 4)

Male: length, 6·0 mm.; tegmen, 8·0 mm.

Clypeus with maxillary plates forming a shallow curve with disk in apical third but separated from it by lateral carinae of disk. Pronotum with lateral carinae of disk strongly divergent, reaching hind margin.

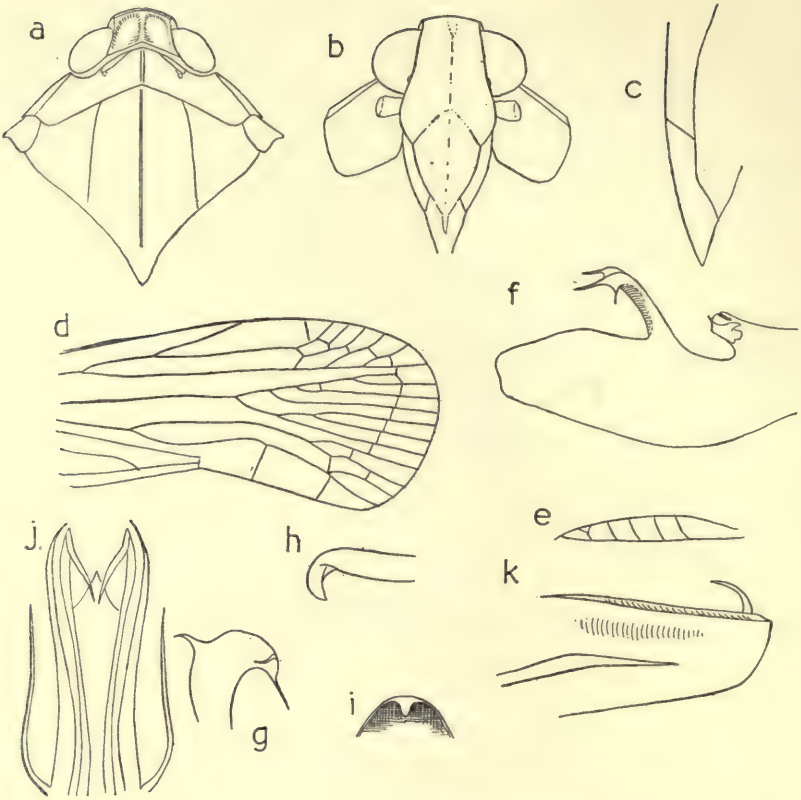

FIG. 3. *Myconus conspersinervis* Stål.

a, head and thorax, dorsal view; *b*, frons and clypeus; *c*, apical portion of clypeus in profile; *d*, apical portion of tegmen; *e*, vein Sc in wing; *f*, right genital style; *g*, apex of process on style; *h*, apex of anal segment in profile; *i*, same in posterior view; *j*, aedeagus, ventro-posterior view; *k*, apex of aedeagus, lateral view.

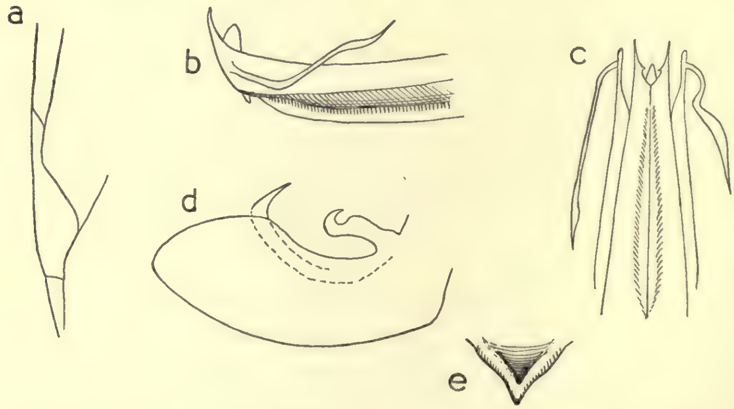

FIG. 4. *Myconus trivittatus*, sp. n.

a, apex of clypeus in profile; *b*, aedeagus, right side; *c*, same, postero-ventral view; *d*, right genital style; *e*, apex of anal segment, posterior view.

Fuscous; tegmina testaceous yellow, abruptly transparent at stigma, a band from base of commissural margin to middle of costa, another from apex of clavus to stigma, a diffuse spot in membrane beyond apex of clavus reaching towards apical angle and a rather broad marginal band fuscous, a few small fuscous spots along the major veins. Wings transparent basally becoming smoky towards margin.

Anal segment of male elongate, suboval, deflexed at apex in a triangular flap, the apex lodging between two points on phallobase. Phallobase tubular, dorsal and ventral margins subparallel in profile, curved dorsad distally, with a median triangular vertical plate in the sagittal plane and a longer spine on each side at tip; a long stout sinuate process arising on each side subapically, directed anteriorly, that of right side directed obliquely antero-dorsad, that of left side longer, directed anteriorly. Genital styles elongate, subovate in profile, apical margin very oblique, convex, a stout tooth arising near dorsal margin on inner face at middle, abruptly bent anteriorly in apical quarter and tapering to a point; a short process on dorsal margin near base terminating in a deep hook.

Described from one male collected at Tijuco Preto, Espiritu Santo, Brazil (in collection of Brit. Mus. N.H.). This species is smaller than *conspersinervis* Stål and is most readily separated from it by the more flattened apical portion of the clypeus, as indicated in the profile figures.

The species *dulcis* Gerst., doubtfully referred by its author to *Myconus* (Gerstaecker 1895), is a cyphoceratopine Tropiduchid possibly belonging in *Arenasella* Schmidt.

The writer is unable to separate *Messoides* Metcalf (Metcalf, 1938) (orthotype, *M. uniformis* Metcalf) from *Myconus* Stål.

MYCONELLUS gen. n.

Closely similar in general appearance to *Myconus* Stål but smaller.

Vertex with median carina in basal half; frons with lateral margins subparallel, median carina weakly present, lateral carinae not prominent; clypeus with lateral carinae weak, median carina absent, antennae with second segment ovoid, somewhat longer than broad, ocellus just touching eye. Pronotum longer than vertex, lateral margins long, ventral margin of lateral fields rounded-tranverse; mesonotum longer than vertex and pronotum together, tricarinate. Post-tibiae trispinose. Tegmina with clavus terminating basad of middle, M with four main branches, Cu forking distad of Sc+R fork.

Anal segment ovate. Hind margin of seventh abdominal sternite medially produced caudad. Type species, *Myconellus tucumanus* sp. n.

Myconellus tucumanus sp. n.

(FIG. 5)

Female: length, 3·1 mm.; tegmen, 5·5 mm.

Yellowish-brown mottled with pale fuscous. Tegmina yellowish-brown, veins faintly infuscate at intervals, a fuscous band overlying apical transverse veins and passing to margin at Cu1b.

Anal segment ovate. Ovipositor with first valvulae narrow, in profile with dorsal margin horizontal, curved upward at apex, ventral margin convex, tapering distally, three to five teeth, equidistant, on dorsal margin, the apical spine long. Third valvulae subquadrate in profile, dorsal margin slightly concave, a rather slender tapering membranous appendage at apex. Bursa copulatrix devoid of sclerotized armature, uniformly covered with small rings. Hind margin of seventh abdominal sternite of female produced caudad at middle in a subquadrate lobe almost as long as broad, with lateral margins slightly convex and tapering distally, and apical margin shallowly excavate.

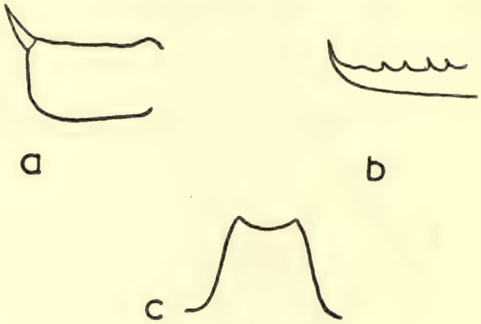

FIG. 5. *Myconellus tucumanus*, sp. n.
a, third valvula of ovipositor, right side; *b*, second valvula of ovipositor, right side; *c*, middle portion of posterior margin of pregenital sternite.

Described from a single female collected in Tucuman Province, Argentina, B.M. 1902-288. Type in Brit. Mus. (N.H.). This genus is close to *Myconus* but is readily separated by its smaller size, as well as by the characters given. It differs from *Epiptera* in the shape of the vertex and in tegminal venation.

CIXIDIA Fieber

1866. *Cixidia* Fieber, *Verh. zool.-bot. Ges. Wien.* **16**:499, pl. VII, fig. 5.
Haplotype, *Cixius confinis* Zetterstedt.

As the writer has not seen *C. confinis* the above tribal assignment should be regarded as tentative.

EPIPTERA Metcalf

1922. *Epiptera* Metcalf, *Canadian Ent.* **54**:264.
Orthotype, *Flata opaca* Say 1830, *J. Acad. Nat. Sci. Phil.* **6**:239.

This genus, as far as the writer is aware, is found only in the holarctic region.

Epiptera fusca (Walker) comb. n.

(FIGS. 6, 7)

1851. *Monopsis fusca* Walker, *List Hom. Ins. Brit. Mus.* **2**:326.
1851. *M. floridae* Walker, ibid. 326.

The writer has compared the types of *fusca* Walker and *floridae* Walker and is satisfied that they are conspecific. The former is slightly larger than the type of

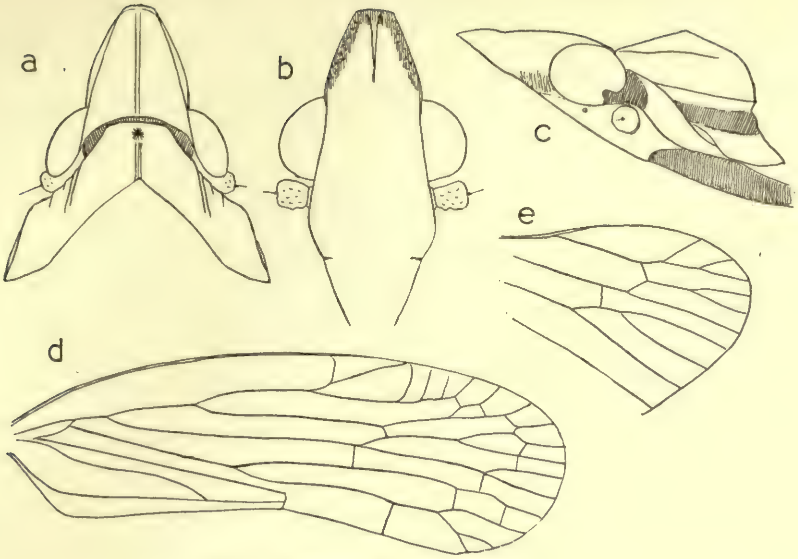

FIG. 6. *Epiptera fusca* (Walker).
a, head and prothorax; *b*, frons; *c*, head in profile; *d*, tegmen; *e*, wing.

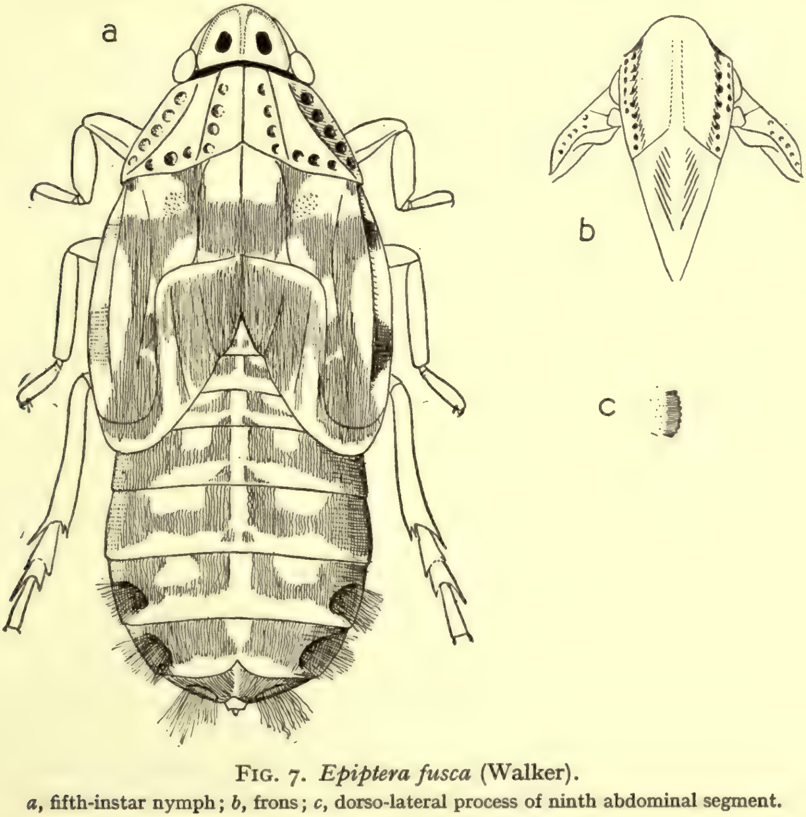

FIG. 7. *Epiptera fusca* (Walker).
a, fifth-instar nymph; *b*, frons; *c*, dorso-lateral process of ninth abdominal segment.

floridae, but this discrepancy may be resolved if it be assumed that the type of *fusca*, which lacks the abdomen, is a female. As *fusca* is listed by Walker before *floridae* the latter must be suppressed as a synonym. The figures are from the type of *fusca*.

Tribe ELIDIPTERINI

Head half as wide as pronotum, frons elongate, no complete carina on pronotum between eye and tegula, or only one, median carina usually indicated on mesonotum, or fully present; tegmina often with distorted venation in membrane, apical areoles usually short. Seventh sternite of female not produced or only very slightly so.

The Elidipterini are all pallid, being powdered with white or greyish-white wax. In most genera the apical portions of the tegmina overlap when the latter are at rest. They have probably been derived from Achilini through forms similar to *Aneipo*.

Key to Genera of Elidipterini

1 (2) Tegmina with a distinct rounded dark callus distally in M; subapical venation markedly irregular 3
2 (1) Tegmina without such a callus; venation nearly regular 13
3 (4) Tegmina almost three times as long as broad at widest part . . 5
4 (3) Tegmina less than 2·5 times as long as wide 9
5 (6) Vertex ecarinate; tegmina with two subapical callosities, apical margin sinuate . . . . *Messeis* Stål
6 (5) Vertex with a broad median carina; tegmina with one subapical callus, apical margin convex, deeply rounded 7
7 (8) Claval veins united basad of middle of clavus . *Neomenocria* gen. n.
8 (7) Claval veins united distad of middle . . . *Paraphradmon* gen. n.
9 (10) Frons more than 1·4 times as long as broad; tegmina less than 2·4 times as long as broad, with two callosities subapically 11
10 (9) Frons 1·4 times as long as broad; tegmina 2·4 times as long as broad, with one minute callus . . . . . *Prinoessa* gen. n.
11 (12) Anterior margin of vertex almost transverse, vertex longer at sides than in middle line; frons 1·7 times longer than broad; third valvulae of ovipositor three times as long as broad . *Metaphradmon* gen. n.
12 (11) Anterior margin of vertex strongly convex, vertex not or scarcely longer at sides than in middle line; frons 1·9 times as long as broad; third valvulae 1·9 times as long as broad . . . . . *Elidiptera* Spin.
13 (14) Frons not twice as long in middle line as broad 17
14 (13) Frons more than twice as long in middle line as broad . . . 15
15 (16) Width of costal cell one-fifth length to stigma. Common claval vein more than two-thirds length of first claval vein before junction *Parelidiptera* gen. n.
16 (15) Anterior margin of vertex broadly convex. Width of costal cell much less than one-fifth length. Common claval vein not nearly two-thirds length of first claval vein before junction . . . *Katbergella* gen. n.

17 (18) Width of costal cell at widest part one-quarter length to stigma. Sc simple *Uniptera* Ball.
18 (17) Width of costal cell less than one-quarter length. Sc with supernumerary veinlets . . . . *Mabira* gen. n.

NEOMENOCRIA gen. n.

Vertex between eyes wider than long in middle line, anterior margin carinate, convex, lateral margins carinate, straight, diverging caudad, posterior margin excavate approximately to level of anterior margin of eyes, disk with a marked depression on each side of broad median ridge which widens distally; frons twice as long as broad, lateral margins straight or slightly sinuate to below level of antennae, thence incurved to suture, width at apex 1·4 times width at base, median carina broad, percurrent, fronto-clypeal suture slightly impressed, clypeus with median carina broad. Antennae ovate. Pronotum in middle line slightly shorter than vertex, disk large; mesonotum tricarinate.

Tegmina not quite three times as long as wide, costal margin strongly convex near base, apical margin evenly rounded. Sc+R forking slightly distad of Cu1 fork, latter approximately level with apex of clavus, a small callus in M three-quarters from base, approximately seven apical areoles in Sc and R, five in M, and two in Cu.

Posterior margin of pygofer biconcave, medioventral process broad.

Type species, *Elidiptera advena* Spinola 1839. *Ann. Soc. ent. Fr.* **8**:305, pl. 6, figs. 3, *a*, *b*, *c*.

This European genus would seem to be near *Paraphradmon* and *Parelidiptera* but differs markedly in the shape of the vertex, the relative size of the antennae and the tegminal venation.

ELIDIPTERA Spinola

1839. *Elidiptera* Spinola, *Ann. Soc. ent. Fr.* **8**:304. Logotype, *E. callosa* Spinot.
1843. *Helicoptera* Amyot and Serville, *Hist. nat. Ins. Hémipt.*: 526.

Elidiptera callosa Spinola

(Fig. 8)

1839. *Elidiptera callosa* Spinola, *Ann. Soc. ent. Fr.* **8**:305.

Anal segment of female short, anal style elongate, setiferous. Ovipositor with first valvulae curved shallowly dorsad to form a stout spine at apex, three broad teeth on dorsal margin, thin, progressively reduced distally, ventral lobe unsclerotized, setiferous; third valvulae with dorsal margin horizontal, membrane on apical margin deep, narrowly cleft near middle. Vagina supported by a deep flat sclerotized plate on each side and a shallowly scoop-like plate ventrally, the last extending basally into a narrow scoop-like lobe. Bursa copulatrix armed with a sclerite consisting of a transverse narrow lenticular plate bearing at its middle a long stout spine directed into the lumen of the bursa.

Redescribed from two females taken at Kutari Sources, British Guiana, by G. A. Hudson (Jan.–Feb. 1936), Brit. Mus. 1936–360.

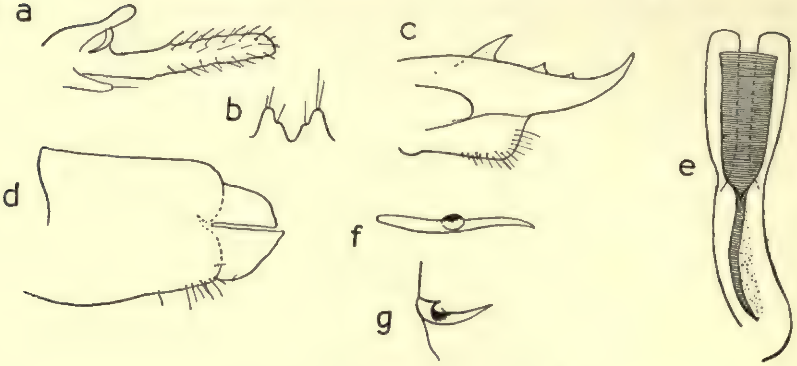

FIG. 8. *Elidiptera callosa* Spinola

a, telson, side view; *b*, latero-ventral processes of anal segment of female; *c*, first valvula of ovipositor, left side; *d*, third valvula of ovipositor, left side; *e*, sclerites supporting vagina; *f*, sclerite in bursa copulatrix, plan; *g*, same, side view.

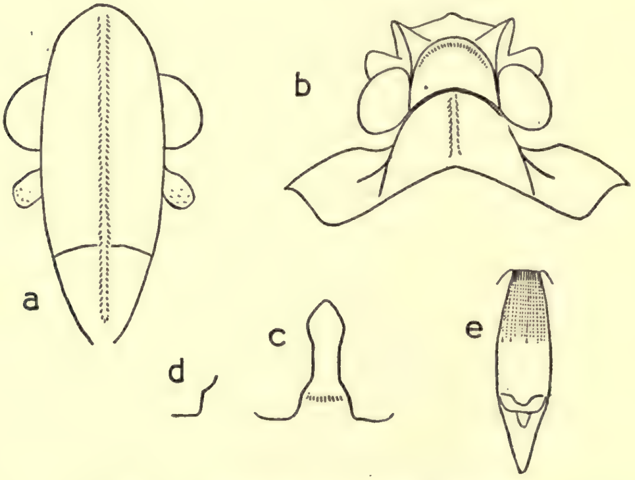

FIG. 9. *Elidiptera globulifera* (Walker).

a, frons and clypeus; *b*, head and pronotum; *c*, medioventral process of pygofer; *d*, basal portion of same in profile; *e*, anal segment, dorsal view.

Elidiptera globulifera (Walker) comb. n.

(FIG. 9)

1858. *Euria globulifera* Walker, *Insecta Saundersiana, Hom.*: 108.

The type of this species, which is a male, superficially differs from *callosa* in its more pallid coloration, this being most pronounced in the tegmina, where the fuscous markings of *callosa* are developed in a light reddish-brown. It is not justifiable to place these species in synonymy without comparison of genitalia.

Elidiptera docilis Walker belongs in the Tropiduchid genus *Alcestis*.

MESSEIS Stål

1862. *Messeis* Stål, Bidrag Rio Janeiro-trakt. Hemipt. **2**, *K. svenska Vetensk. Akad. Handl.* **3**(6): 66. Haplotype, *M. fuscovaria* Stål.

Vertex between eyes 1·8 times as wide as long in middle line, anterior margin carinate, curved, obtusely subangulate, lateral margins carinate, converging anteriorly, posterior margin excavate, disk ecarinate, slightly depressed; frons 1·7 to 2·0 times longer than broad, lateral margins shallowly convex, carinate, median carina percurrent to distal portion of clypeus; rostrum just attaining post-coxae. Pronotum as long as or exceeding vertex, disk large, medially and laterally carinate, lateral carinae convex; mesonotum tricarinate. Post-tibiae with one spine distad of middle.

Tegmina 2·7 to 2·9 times as long as wide at widest part, anterior margin slightly convex, apical margin deeply rounded with a shallow sinus at Cu1b; Sc+R+M forking less than one-quarter from base, Sc+R forking about one-third from base, M simple to nodal line, Cu1 forking about two-fifths from base, Sc simple to apex or once forked, R two-branched, M with five apical veins, Cu1a with three, Cu1b with two; two callosities, one in subapical cell M3 and one basad of this on Cu1a. Wings with R forked very near apex, M three-branched.

Anal segment of male short, telson long. Pygofer with medioventral process short, stout, broader across base than long.

Messeis fuscovaria Stål

(FIG. 10)

1862. *Messeis fuscovaria* Stål, loc. cit.: 66.

Female: length, 3·8 mm.; tegmina, 5·9 mm.

The tegminal venation of Stål's female type is slightly variable; the vein shown in broken line is absent from one side.

Messeis elidipteroides sp. n.

(FIG. 11)

Male: length, 5·2 mm.; tegmen, 6·5 mm.

Frons with median carina very prominent at base; vertex three times as wide as long in middle line.

Testaceous-grey; tegmina greyish, translucent, a series of five oblique pale fuscous narrow bars in costal cell, the penultimate bar near stigma extending across to apical areoles of Cu1a, apical areoles infuscate between M3 and Cu1b, subapical areoles narrowly fuscous close to margins, a series of four narrow pale oblique lines across corium between Sc and Cu, very faint.

Anal segment of male very short, telson elongate, deflexed. Pygofer with medioventral process stout, twice as broad as long in ventral view, apical margin sinuate; this process in lateral view curved, stout, subtriangular. Phallobase comprising a straight sclerotized bar dorsally in middle line obliquely truncate at apex; with a spine directed upward at its base; below this a semi-membranous scoop-like structure

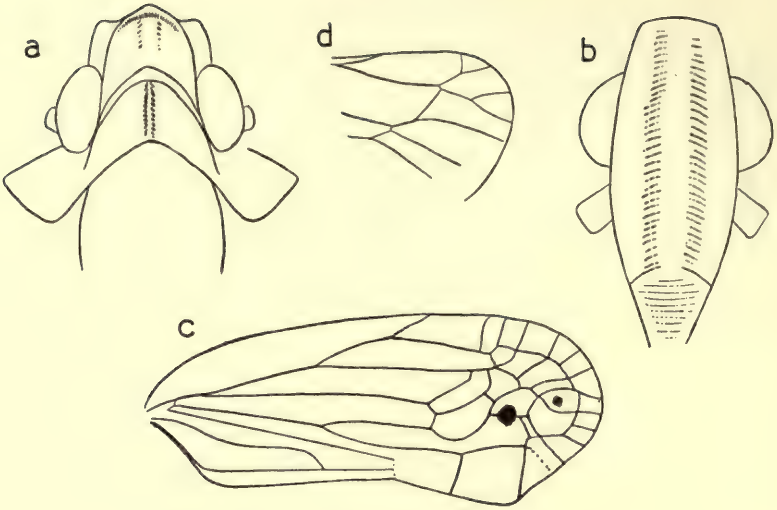

FIG. 10. *Messeis fuscovaria* Stål.
a, head and pronotum; *b*, frons; *c*, tegmen; *d*, apex of wing.

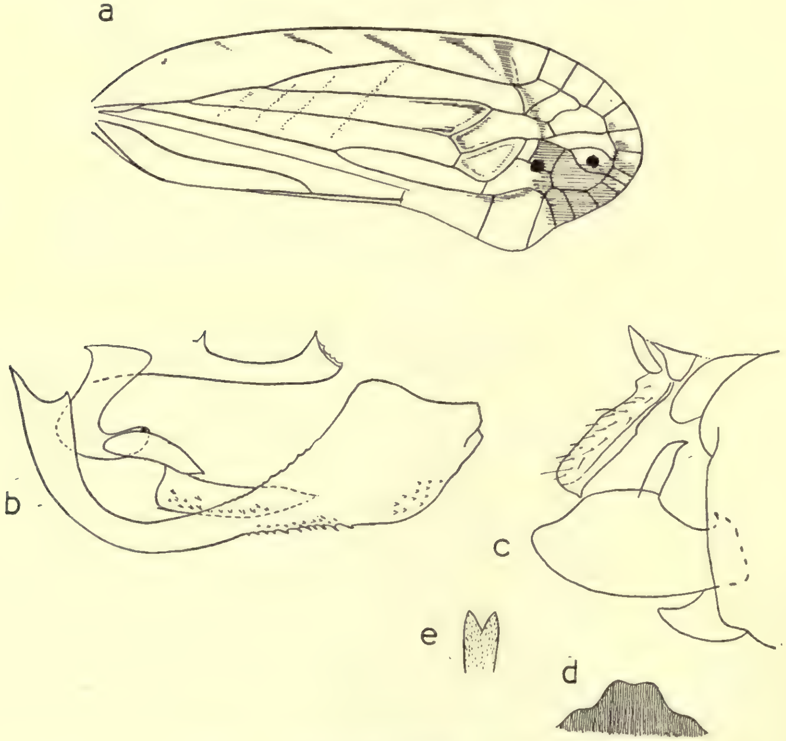

FIG. 11. *Messeis elidipteroides*, sp. n.
a, tegmen; *b*, aedeagus, left side; *c*, anal segment, posterior margin of pygofer and genital style, right side; *d*, medioventral process of pygofer; *e*, apex of process of aedeagus.

supported laterally at base by sclerotized plates, and below by a denticulate plate on each side of middle line. Phallic appendages stout, curved dorsad distally and in profile each expanded into a broad quadrate plate at apex, dorsal and ventral margins denticulate. Genital styles rhomboidal in profile with a stout pointed process arising on inner face near dorsal margin, and a crescentic transverse sclerotization on dorsal margin at base.

Described from one male collected by A. Maller (1930) labelled 'Brazil, Sta. Catharina, Hansa Humboldt W. 50, S. 56 100 m.' Brit. Mus. 1930–286. This species differs from the type species in size, proportions of vertex and frons, in details of tegminal venation, and in colour pattern.

PARAPHRADMON gen. n.

Vertex between eyes 2·5 times as wide as long in middle line, anterior margin carinate, curved, obtusely subangulate, lateral margins carinate, converging anteriorly, posterior margin excavate, disk somewhat depressed with a strong median carina; frons longer than broad (1·6:1), lateral margins shallowly convex, carinate, median carina distinct, not much raised; clypeus with a triangular depressed area at extreme base, slightly tumid medially but devoid of a distinct carina; rostrum attaining post-coxae, apical segment half length of subapical; antennae with second segment short, a little longer than broad. Pronotum slightly longer than vertex, disk large, medially and laterally carinate, lateral carinae convex, one carina laterally between eye and tegula, and a short trace of a second; mesonotum tricarinate. Post-tibiae with one spine.

Tegmina about 2·8 times as long as wide at widest part, anterior margin slightly convex, apical margin deeply rounded, devoid of any sinus; Sc+R+M forking one-sixth from base, Sc+R forking about two-fifths from base, M simple to nodal line, Cu1 forking at middle of tegmen slightly basad of apex of clavus; Sc simple to apex (omitting the stigmal branch), R two-branched, M with five apical veins, Cu1a and Cu1b each two-branched; a callus in cell M3, a small elongate rectangular cell near it on Cu1a. Wings with R simple to apex, M with three branches.

Seventh abdominal sternite of female with posterior margin produced medially.

Type species, *Paraphradmon albus* sp. n.

Paraphradmon albus sp. n.

FIG. 12

Female: length, 6·5 mm.; tegmen, 7·5 mm.

Stramineous to pallid. Tegmina white, three short faint darker lines obliquely in costal cell at stigma, callus in M fuscous. Wings translucent. Insect powdered white.

Anal segment of female very short, tenth segment short, ring-like, produced into a pair of short lobes on posterior margin, each lobe tricuspidate and bearing a seta at apex of each cusp, telson long, subcylindrical. Seventh sternite produced at middle of posterior margin into a small triangular lobe, wider across base than long in middle. Subvaginal plate scoop-like, narrowing to a point ventrally. Dorsal wall of vagina sclerotized into a rectangular plate three times as long as wide. First valvulae of ovipositor in profile with dorsal and ventral margins parallel, the dorsal margin decurved near apex and bearing four teeth, of which the second from the base is short, and the apical is provided with a short submarginal tooth at its base; ventral lobe of first valvula thin, carried vertically, its dorsal margin straight, ventral margin convex, setose. Third valvulae only a little longer than broad, subtriangular, dorsal margin longer than ventral, apical membrane rounded at dorsal angle; a series of five vertical ridges on inner face of valvula near base, descending obliquely. Bursa copulatrix bearing a small lenticular sclerite laterally near opening into vagina, this sclerite bearing a single tooth projecting obliquely into lumen of bursa.

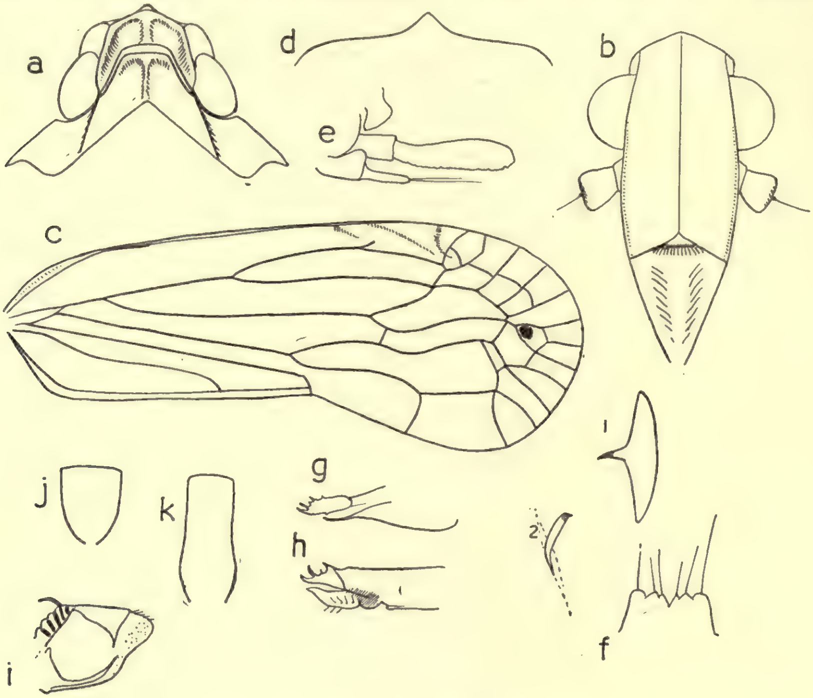

FIG. 12. *Paraphradmon albus*, gen. et sp. n.

a, vertex and pronotum; *b*, frons and clypeus; *c*, tegmen; *d*, posterior margin of pregenita sternite; *e*, anal segment of female, lateral view; *f*, processes of anal segment; *g*, *h*, ventro-lateral and lateral views of first valvulae; *i*, right third valvula, inner aspect; *j*, posterior view of subvaginal plate; *k*, ventral view of sclerite in vagina; 1 lateral and 2 dorsal views of sclerite on bursa copulatrix near entrance.

Described from a single female in the Brit. Mus. (N.H.) taken at Tijuco Preto, Espiritu Santo, Brazil. *Paraphradmon* in general appearance is closest to *Messeis*.

PRINOESSA gen. n.

Vertex basally twice as wide between eyes as long in middle line, anterior margin carinate, curved, obtusely subangulate, lateral margins carinate, only slightly converging between eyes, rounded into apical carina, posterior margin roundly excavate, disk depressed, devoid of median carina but with callosities on hind margin.

Frons longer in middle than broad (about 1·5:1), lateral margins very shallowly convex, expanding to below level of antennae then gently incurved to clypeus, carinate, scarcely raised, median carina feeble, clypeus with median carina obsolete, laterally carinate. Antennae surpassing eyes. Pronotum slightly longer than vertex, disk large, carinate laterally and in basal half of middle line, depressed medially behind anterior margin, one complete and one incomplete carina on each side between eye and tegula; tegulae large, ecarinate, mesonotum tricarinate.

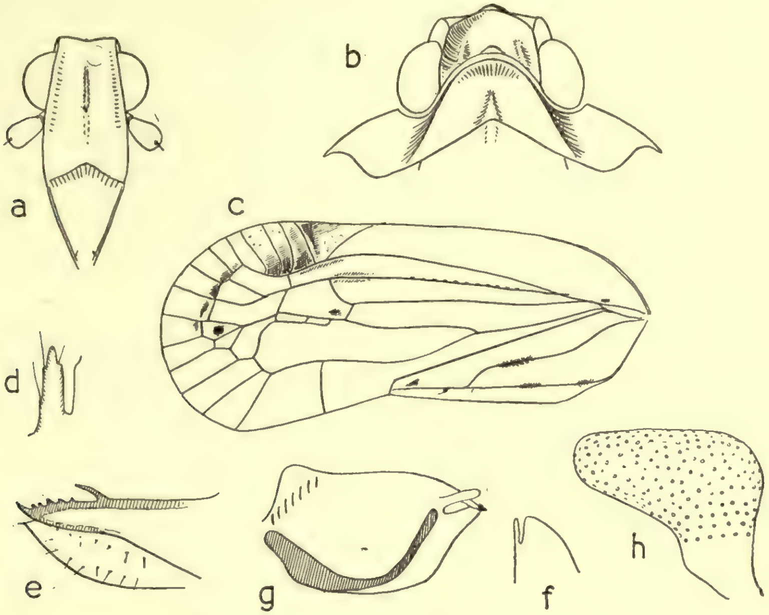

FIG. 13. *Prinoessa livida*, gen. et sp. n.

a, frons and clypeus; ***b***, vertex and pronotum; ***c***, tegmen; ***d***, one of paired processes on anal segment of female; ***e***, first valvula, lateral view; ***f***, dorsal view of apex of third valvula, semi-diagrammatic; ***g***, third valvula, inner aspect; ***h***, bursa copulatrix, semi-diagrammatic.

Tegmina about 2·4 times as long as wide at widest part, anterior margin almost straight except near base, apical margin deeply evenly rounded; Sc+R+M forking two-thirteenths from base, Sc+R forking one-fifth from base, M forking at level of stigma, Cu forking about one-third from base; Sc with about four branches, R three-branched, M four-branched (1, 2, 3, 4), Cu1a two-branched, Cu1b two-branched, a callus in subapical cell M3.

Type species, *Prinoessa livida* sp. n.

Prinoessa livida sp. n.

(FIG. 13)

Female: length, 5·1 mm.; tegmen, 6·0 mm.

Vertex with three callosities on hind margin, the outer two longer than middle;

frons 1·4 times as long as broad, slightly convex in basal half, median carina feeble, distinctly stronger between middle and basal quarter.

Pallid stramineous; carinae of vertex tinged orange-yellow, pronotum and mesonotum near carinae minutely speckled fuscous-piceous. Tegmina greyish-white, costal cell, veins, and to a less degree intervenal areas minutely speckled fuscous; two dark agglomerations on posterior claval vein, a faint much-broken fascia from stigma to apex of clavus, a clouded line across inner portion of anterior apical areoles fuscous-piceous.

Anal segment short, a pair of narrow quadrisetose lobes directed posteriorly, anal style elongate-ovate. First valvulae of ovipositor with first, fourth, and apical teeth larger than remainder; ventral lobe large, membranous, lenticular, sparsely setiferous; third valvulae broad, with dorsal margin almost horizontal, ventral margin convex, apical angle deeply cleft giving rise to a finger-like lobe; a strong spine arising on inner face near base curved upward and mesad.

Bursa copulatrix devoid of sclerotized processes, ornamented with small circles evenly and rather widely spaced.

Described from one female collected at Kutari Sources, British Guiana, by G. A. Hudson (Jan.–Feb. 1936) Brit. Mus. 1936–360. The genus *Prinoessa* is readily distinguished by the form of the vertex and tegmina; the structure of the third valvulae of the ovipositor in the type species is noteworthy in that it exhibits a complexity unusual in the group, though it is not difficult to understand how it has been reached by modification of the sclerotic elements found in other genera such as *Paraphradmon*.

METAPHRADMON gen. n.

Vertex across base longer than in middle line (4:1), only very slightly produced before eyes, medially carinate, anterior margin carinate, very obtusely angulate, subtruncate, lateral margins carinate, straight, subparallel, posterior margin angulately excavate (about 130°); frons convex, longer than broad (about 1·7:1), a little wider at base than at apex, lateral margins convex, basal margins truncate, disk slightly depressed between middle line and margins, lateral carinae not foliately produced; clypeus short, medially and laterally carinate, a little more than half as long as frons; rostrum with subapical segment longer than apical; antennae ovate, not sunk in a depression, ocelli narrowly separated from eyes, eyes slightly excavate below, not markedly overlapping pronotum. Pronotum with disk well defined, medially and laterally carinate, lateral carinae straight or slightly concave, diverging basad, ventral margin of lateral pronotal lobes angulate and oblique; mesonotum longer than vertex and pronotum combined, tricarinate distinctly; pro-tibiae about as long as pro-femora, post-tibiae with a single spine in basal third. Tegmina 2·5 times as long as broad, Sc+R forking at basal third, Cu1 forking slightly distad of union of claval veins, about sixteen apical areoles distad of stigma, clavus terminating distad of middle. Wings with R four-branched, M three-branched.

Anal segment of female elongate-ovate.

Type species, *Metaphradmon tortrix* n. sp.

Metaphradmon tortrix sp. n.

(Fig. 14)

Female: length, 6·0 mm.; tegmen, 9·8 mm.

Head vertical behind posterior margin of vertex.

Stramineous-testaceous; clypeus, a band bordering median and lateral carinae of frons, vertex, and pronotum, lateral fields of pronotum except a wedge-shaped mark and two spots, a short stripe anteriorly and a broad transverse band on mesonotal disk, lateral fields of mesonotum except for a sinuate spot, legs except bases of pro-tibiae and meso-tibiae, ferruginous to fuscous. Tegmina mostly fuscous, four irregular curved spots in costal cell, cells Sc and Sc+R largely sprinkled testaceous; a wedge-shaped stripe in Sc at stigma, a stripe across Sc4 and Sc5, a spot or area in all subapical cells and apical cells of R, and as far as M2 and a large spot beyond apex of clavus and two spots in cell distad of it ochraceous; veins concolorous with corium or membrane which they traverse, two calloused spots in M piceous. Wings slightly infuscate, veins darker, except M–Cu cross-vein which is pallid.

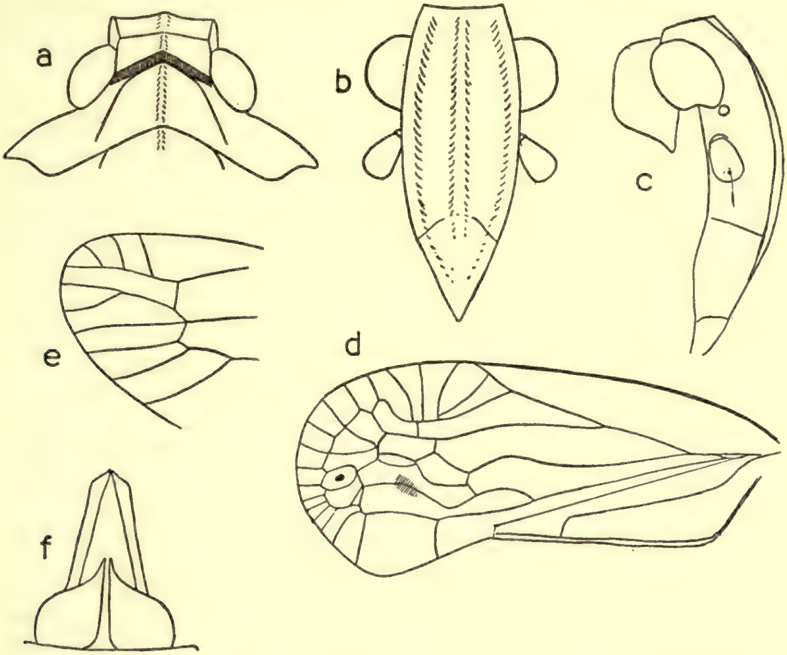

Fig. 14. *Metaphradmon tortrix*: gen. et sp. n.

a, vertex and pronotum; *b*, frons and clypeus; *c*, head in profile; *d*, tegmen; *e*, apex of wing; *f*, posterior margin of pregenital sternite, eighth segment and third valvulae, ventral view.

Posterior margin of pregenital sternite of female transverse; lateral portions of eighth segment produced into a point. Ovipositor with third valvulae about three times as long as broad.

Described from a single female from San Paulo, Brazil. Type in Naturhistoriska Riksmuseum, Stockholm. *Metaphradmon* is distinguished by the shape of the vertex, the tegminal venation, and the shape of the ventro-lateral lobes of the eighth segment.

KATBERGELLA gen. n.

Vertex between eyes about 3·5 times as wide as long in middle line, anterior margin carinate, broadly convex, lateral margins carinate, converging distally and curving into anterior margin, posterior margin deeply excavate, disk depressed, median carina strong in basal half, absent distally; frons more than twice as long as broad, lateral margins straight, diverging to below level of antennae, slightly incurved to suture; clypeus not sharply demarcated from frons, antennae with second segment short, slightly longer than broad. Pronotum much longer than vertex, disk large, medially and laterally carinate, two carinae at each lateral margin between eye and tegula; mesonotum medially carinate in apical half, laterally carinate throughout. Post-tibiae unispinose.

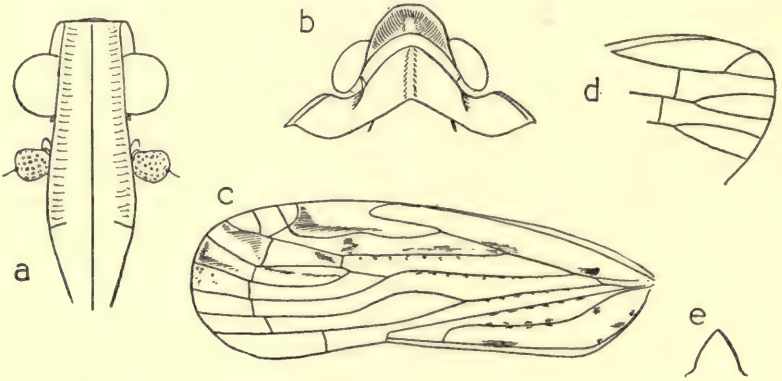

FIG. 15. *Katbergella griseobrunnea*: gen. et sp. n.
a, frons; *b*, vertex and pronotum; *c*, tegmen; *d*, apex of wing; *e*, medioventral process of pygofer.

Tegmina about three times as long as wide at widest part, anterior margin slightly convex, apical margin evenly rounded; Sc+R+M forking about one-sixth from base, Sc+R forking about one-third from base, M forking at level of nodal line, Cu1 forking two-fifths from base; Sc forked at level of union of claval veins, with its distal branch bifurcate near margin, R with two branches at margin, M with three, Cu1a and Cu1b each simple. Wings with Sc simple, R and M each two-branched.

Seventh abdominal sternite of female with posterior margin produced caudad.

Type species, *Katbergella griseobrunnea* sp. n.

Katbergella griseobrunnea sp. n.

(FIG. 15)

Female: length, 5·5 mm.; tegmen, 7·0 mm.

Tegmina with a narrow but distinct costal area.

Pale testaceous, lightly marked fuscous; a series of four spots on lateral margins of frons and a broad band across frontoclypeal suture ochraceous; a spot below eyes, and also below antennae, and lateral fields of pronotum fuscous. Tegmina pallid, translucent, slightly sprinkled fuscous, with a distinct rounded spot in costal cell near Sc+R+M stalk. Wings hyaline, powdered greyish-white.

Pregenital sternite with a triangular medioventral process, as long as broad across base. Anal style short, not exceeding apical margin of segment.

Described from a single female taken at 4,000 ft., Katberg, E. Cape Province, South Africa, by R. E. Turner (1–12 March, 1933) Brit. Mus. 1933–198. *Katbergella* is distinguished by its elongate frons and by its tegminal venation, which is almost Plectoderine in its simplicity.

MABIRA gen. n.

Vertex between eyes three times as wide as long in middle line, anterior margin carinate, broadly convex, lateral margins carinate, converging anteriorly to merge into anterior carina, posterior margin excavate, disk somewhat depressed, median carina distinct; frons longer than broad, lateral margins shallowly convex, carinate, median carina distinct, antennae with second segment short, a little longer than broad. Pronotum longer than vertex in middle line, medially and laterally carinate, two more or less complete carinae between eye and tegula; mesonotum tricarinate. Post-tibiae unispinose.

Tegmina 2·6 times as long as wide at widest part, anterior margin slightly convex, apical margin deeply rounded. Sc+R+M forking one-seventh from base, Sc+R forking about one-third from base, M forking at level of nodal line, Cu1 forking two-fifths from base just distad of union of claval veins, Sc with supernumerary branches at margin, R two-branched at apex, M regular, with four branches, Cu1a simple, Cu1b with two branches.

Seventh abdominal sternite of female with posterior margin transverse. Anal style much exceeding apical margin of segment.

Type species, *Mabira pallida* sp. n.

Mabira pallida sp. n.

(FIG. 16)

Female: length, 6·3 mm.; tegmen, 8·0 mm.

Stramineous; genae and disk of vertex slightly infuscate. Tegmina greyish-white, a spot in cell R behind fork Sc+R, a spot in subapical cells R1+2, M1, and M2, a spot just distad of apex of clavus and a few faint chevron-like bars across veins of Cu in corium fuscous-piceous. Wings pallid, veins testaceous. Insect powdered pallid.

Anal segment of female short, tubular. Anal style elongate-triangular, distally decurved. Seventh abdominal sternite posteriorly transverse. First valvulae of ovipositor with ventral lobes short, triangular, as long as broad at base. Third valvulae subquadrate, apical margin convex-truncate. Bursa copulatrix furnished with an L-shaped sclerite, pointed at one extremity.

Described from a single female taken at Mabira, Uganda, by C. C. Gowdey (18 July, 1911) Brit. Mus. 1948–549. The genus is readily distinguished by the tegminal venation.

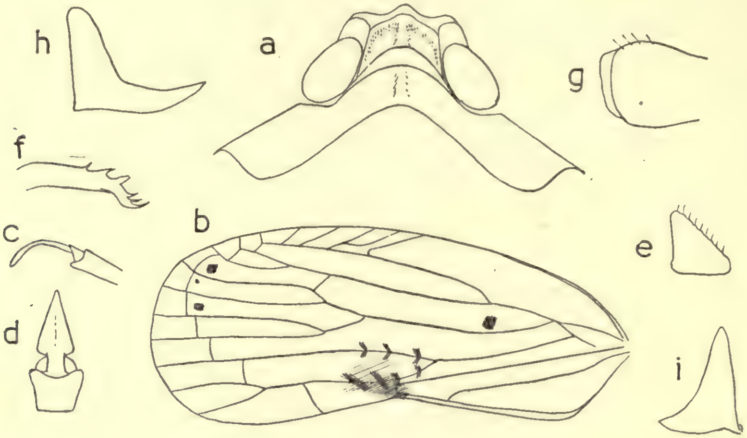

FIG. 16. *Mabira pallida,* gen. et sp. n.

a, vertex and pronotum; *b*, tegmen; *c*, anal segment of female, side view; *d*, same, dorsal view; *e*, ventral lobe of first valvula; *f*, first valvula in profile, ventral lobe removed; *g*, third valvula in profile; *h*, *i*, two views of sclerite in bursa copulatrix.

PARELIDIPTERA gen. n.

Vertex at base about twice as wide as long in middle line, all margins and middle line stoutly carinate, disk depressed on each side of middle line, anterior margin subangulately transverse, lateral margins slightly converging anteriorly, posterior margin shallowly excavate, occiput long, vertical; frons elongate, fully twice as long as broad, lateral margins carinate, diverging to below level of antennae, thence incurved to suture; median carina percurrent to distal part of clypeus; antennae projecting beyond eyes, second segment slightly longer than broad. Pronotum longer than vertex, disk large, laterally carinate, median carina feeble or obsolete, one carina at lateral margin between eye and tegula; mesonotum with carinae obsolete or absent.

Tegmina about 2·4 times as long as wide, anterior margin slightly convex, strongly so near base, apical margin deeply and evenly rounded, Sc+R+M forking near basal sixth, Sc+R forking about one-third from base, M forking at nodal line, Cu1 forking near middle of tegmen basad of apex of clavus; Sc, omitting stigmal branch, four-branched distally, R four-branched, M five-branched, Cu1a three-branched, Cu1b two-branched. Wings with R two-branched, M three-branched, Cu1a simple.

Anal style large, almost circular, setose. Bursa copulatrix with a simple sclerotized plate dorsally.

Type species, *Parelidiptera teres* sp. n.

Parelidiptera teres sp. n.

(FIG. 17)

Female: length, 7·0 mm.; tegmen, 9·7 mm.

Vertex slightly declivous anteriorly, frons in middle line 2·25 times as long as broad, greatest width about one-quarter from apex.

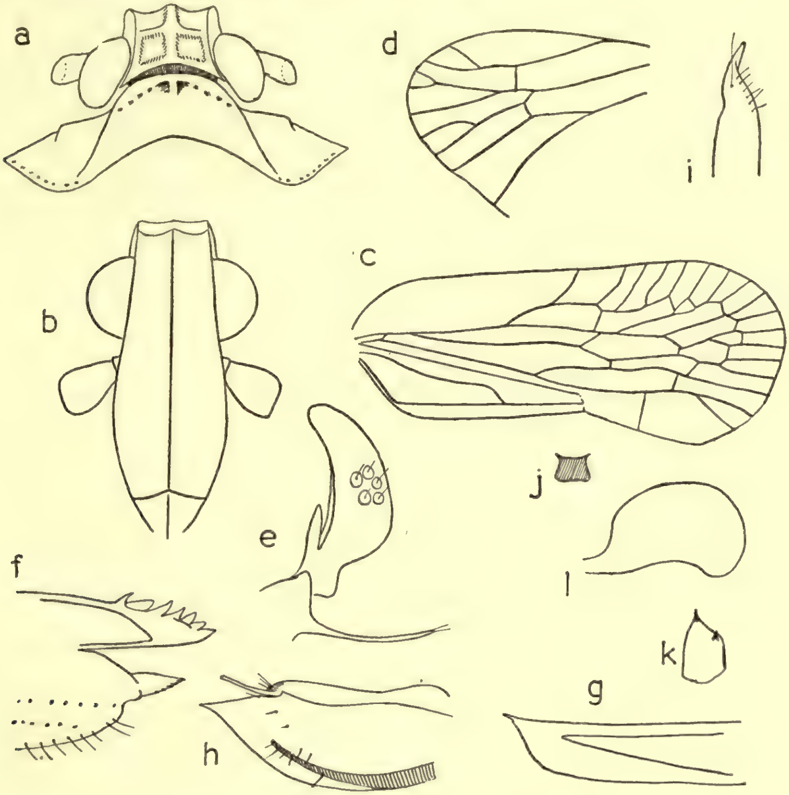

FIG. 17. *Parelidiptera teres*: gen. et sp. n.

a, vertex and pronotum; ***b***, frons; ***c***, tegmen; ***d***, apex of wing; ***e***, anal segment and style, lateral view with most of setae on latter omitted; ***f***, first valvula; ***g***, second valvula; ***h***, third valvula (all valvulae in lateral view); ***i***, ventral lobe of first valvula; ***j***, subvaginal plate, posterior view; ***k***, sclerite in bursa copulatrix; ***l***, bursa copulatrix.

Ashy-grey, minutely and sparsely speckled fuscous; abdomen testaceous, powdered white. Tegmina ashy, minutely speckled fuscous, a dark area in middle of costal cell and an oblique area extending between margin at stigma and R, veins pallid. Wings translucent, powdered white.

Anal segment produced into two long cylindrical processes at lateral ventral angles, each process bisetose at apex, anal style large, subcircular in outline, thick, beset with stout setae. Ovipositor with first valvulae bilobed, dorsal lobe sclerotized distally and armed on upper margin near apex with seven subequal teeth, ventral lobe broad, setose, abruptly rounded distally, middle of distal margin produced in a small triangular lobe; second valvulae in profile with dorsal and ventral margins straight, parallel, the ventral curving upward distally to form a point at apex; third valvulae broad with dorsal margin straight or nearly so, ventral margin convex, apex pointed, a sclerotized rod arising on inner face near base and lying close to ventral margin. Subvaginal plate very small, quadrate. Bursa copulatrix ovoid, armed in middle of dorsal surface with a small ovate sclerotized plate bearing two short teeth.

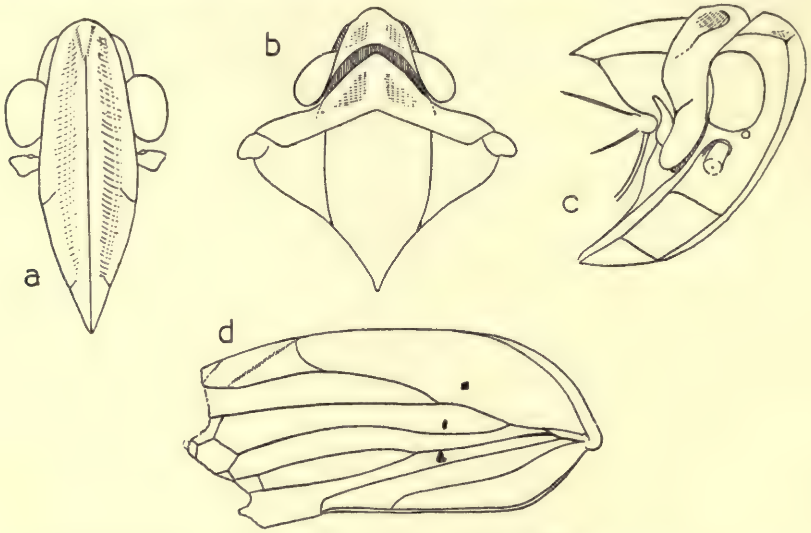

Fig. 18. *Uniptera ampliata* Ball.
a, frons and clypeus; *b*, vertex, pronotum and mesonotum; *c*, head in profile; *d*, tegmen.

Described from one female taken at Paraná, Brazil, by E. Dukinfield Jones, Brit. Mus. 1907–12. Type in collection of Brit. Mus. (N.H.).

UNIPTERA Ball

1933. *Uniptera* Ball, *Pan-Pacific Ent.* **9**: 133. Orthotype, *Uniptera ampliata* Ball.

Uniptera ampliata Ball

(Fig. 18)

1933. *Uniptera ampliata* Ball, loc. cit.: 134.

The figures have been kindly prepared by Dr. Paul Oman from the holotype in the U.S. National Museum. As far as the writer is aware *Uniptera* is the only representative of the tribe in the Nearctic Pacific coast area.

Tribe BREDDINIOLINI

Vertex transverse, subquadrate, frons with lateral carinae produced anteriorly, clypeus carinate laterally and medially, rostrum with subapical segment longer than apical, antennae exposed dorsally, not sunk in a pit, second segment ovoid, ocelli not touching eyes, eyes emarginate posteriorly. Pronotum relatively long at sides with lateral carinae enclosing a circular fovea; mesonotum longer than vertex and pronotum combined, obsoletely tricarinate. Pro-tibiae shorter than femora with trochanters, post-tibiae with three spines. Tegmina relatively broad, clavus terminating distad of middle, Sc and R not forming a common stalk.

The species of this tribe known to the writer are almost wholly piceous. One genus is known from West Africa and one from Fiji.

KEY TO GENERA OF BREDDINIOLINI

1 (2) Frons medially carinate, lateral margins ampliate just before clypeus, lateral carinae moderately elevated, lateral carinae of clypeus converging distally at 20°; vertex with lateral margins distinctly converging anteriorly. *Breddiniola* Muir

2 (1) Frons smooth medially, lateral margins parallel throughout, lateral carinae strongly raised, subfoliate, lateral carinae of clypeus short, convex, converging distally at an angle of 60°; vertex with lateral margins not or scarcely converging anteriorly . . . *Breddiniolella* gen. nov.

BREDDINIOLA Muir

1934. *Breddiniola* Muir, *Ann. Mag. nat. Hist.* (10) **14**:581. Orthotype, *Breddiniola tangensis* Muir, 1934, loc. cit.

Breddiniola collaris (Haglund) comb. n.

1899. *Achilus? collaris* Haglund, *Öfvers. Vetensk. Akad. Förh. Stockh.* **56**:63.

The description shows this species to be close to *tangensis* Muir, and as both occur in West Africa they may prove to be conspecific.

BREDDINIOLELLA gen. n.

Vertex with anterior margin transverse, lateral margins not or scarcely converging anteriorly, median carina obsolete, indicated only at apex, frons devoid of median carina, lateral carinae foliate anteriorly, clypeus carinate laterally and medially, rostrum with subapical segment distinctly longer than apical, antennae exposed dorsally, second segment ovoid, ocelli not touching margin of eyes; pronotum relatively long laterally, ventral margin of lateral fields angulate and oblique; mesonotum longer than vertex and pronotum together, obsoletely tricarinate; pro-tibiae shorter than femora and trochanters combined, post-tibiae with three spines. Tegmina with Cu1 fork basad of Sc+R fork.

Type species, *Breddiniolella leveri* sp. n.

Breddiniolella leveri sp. n.

(FIG. 19)

Female: length, 4·0 mm.; tegmen, 6·0 mm.

Piceous; apex of clypeus, sides of frons, genae, a line on disk of vertex, a spot on lateral fields of pronotum testaceous-brown. Tegmina sooty-black, costal cell subhyaline.

Anal segment in dorsal view subovate, deeply and narrowly excavate medially at apex, anal style narrow, rounded at apex, not or scarcely exceeding lateral lobes of anal segment. Ovipositor with first valvulae narrowly rhomboidal in profile, furnished at apex with three short closely set teeth in an oblique row, and three more widely separated teeth along dorsal margin; second valvulae horizontal, each elongate, tapering distally with a fringe of setae on outer side and a small setose lobe at base; third valvulae subovate in profile with a broad somewhat falcate lobe on dorsal margin at base and a triangular lobe at apex. Hind margin of seventh abdominal sternite produced in a triangular lobe 1·5 times as long as broad across base.

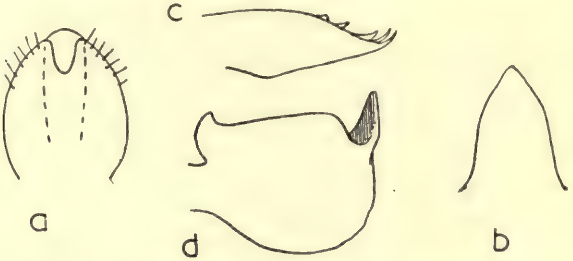

FIG. 19. *Breddiniolella leveri*, gen. et sp. n.
a, anal segment of female, dorsal view; *b*, process of pregenital sternite; *c*, first valvula, lateral view; *d*, third valvula, lateral view.

Described from one female taken under bark by R. A. Lever, Nadala R., Viti Levu, Fiji (7 July 1944), Brit. Mus. 1948–549.

This species, which is dedicated to the collector, is the only member of the tribe known outside Africa.

TRIBE ACHILINI

Vertex not or scarcely two-thirds width of pronotum, pronotum comparatively large, disk elevated, lateral marginal carinae variable, sometimes obsolete, never enclosing a fovea nor comprising two complete carinae which both lie straight and parallel between each eye and tegula. Tegmina large, shallowly tectiform, venation regular throughout, apical branches numerous, Sc and R united in a common stalk basally, no callus developed in M.

With the exception of the neotropical genera *Nelidia* Stål and *Flatachilus* (described below) all members of this tribe are found in the Old World from Africa to Australia. The Australian genus *Bunduica* is placed in this tribe pending a critical examination of the type species.

KEY TO GENERA OF ACHILINI

1 (2) Vertex with disk not depressed or only anterolaterally so, second segment of antennae projecting beyond eyes, carina between eye and tegula obsolete or absent, apical margin of tegmina convex . . . 11

2 (1) Vertex with disk depressed, anterior margin distinctly carinate, antennae not projecting beyond eyes, one or two strong carinae between eye and tegula 3

3 (4) Margins of frons and clypeus not foliate, one carina between eye and tegula . . . 5

4 (3) Margins of frons foliate, if not, then vertex medially carinate throughout, two carinae on each side between eye and tegula . . . 7

5 (6) Clypeus in profile forming a very shallow curve with frons, basal width of vertex not twice length in middle, ventral margin of lateral fields of pronotum smoothly rounded, tegulae large, carinate *Faventilla* Metc.

6 (5) Clypeus in profile forming a strong convexity with frons, interrupted by a notch at suture, basal width of vertex more than twice length in middle, ventral margin of lateral field of pronotum oblique, meeting sides in an acute curve, tegulae minute, ecarinate . . . *Booneta* Dist.

7 (8) Vertex rounding into frons, apical margin obsolete, median carina elevated and percurrent through vertex and frons, margins of frons and clypeus not foliate . . . . *Nelidia* Stål.

8 (7) Vertex devoid of median carina, margins of frons and clypeus strongly foliate 9

9 (10) Vertex more than twice as broad as long, with anterior margin transverse, posterior margin not deeply excavate, frons at widest part not much wider than at base (1·2:1) . . . . *Catonidia* Uhl.

10 (9) Vertex usually not more than twice as broad as long, with anterior margin angulate at middle, posterior margin deeply excavate, frons at widest part twice width at base . . . . *Aneipo* Kirk.

11 (12) Vertex with disk not depressed, anterior marginal carina obsolete, second segment of antennae projecting markedly beyond eyes, apical margin of tegmina rounded . . . . *Achilus* Kirby

12 (11) Vertex with disk depressed anterolaterally, anteriorly carinate, second segment of antennae scarcely surpassing eyes 13

13 (14) Apical margin of tegmina subtruncate . . *Flatachilus* gen. n.

14 (13) Apical margin of tegmina rounded . . . *Bunduica* Jacobi.

Achilus Kirby

1818. *Achilus* Kirby, *Trans. Linn. soc. Lond.* (*Zool.*) **12**:474. Haplotype, *Achilus flammeus* Kirby, loc. cit.: 475.

1843. *Achillus* Amyot and Serville, *Hist. nat. Ins. Hémiptères*: 524.

This genus at present contains only the type species. *A. dilutus* Stål and *A. dulcis* Gerst. belong to the cyphoceratopine Tropiduchidae, *A. conspersinervis* Stål was made by him the type of *Myconus*, *A. collaris* Haglund is a *Breddiniola*, while *A. costalis* Haglund is evidently one of the Plectoderini, probably allied to *Lanuvia*.

Faventilla Metcalf

(FIG. 20)

1948. *Faventilla* Metcalf, *Smith Coll. Gen. Cat. Hem.* Fasc. 4, pt. 10 : 60.

1866. *Faventia* Stål, *Hem. Afr.* **4** :181. Logotype, *Cixius pustulatus* Wlk. 1857 *J. Linn. soc. Lond.* (*Zool.*) **1**:87.

Cixius diffinis Walker and *C. guttifer* Walker are members of this genus.

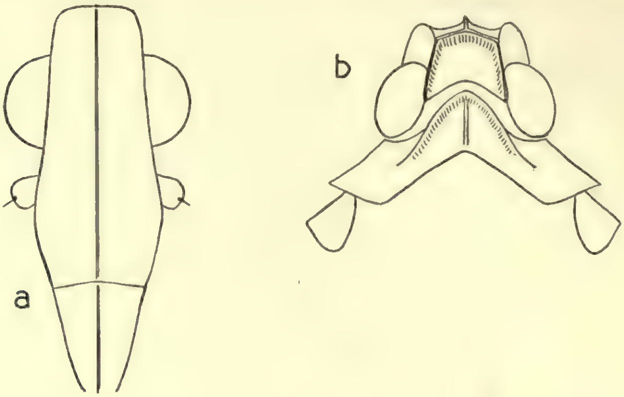

FIG. 20. *Faventilla pustulata* (Walker).
a frons; *b*, vertex and pronotum.

Booneta Distant

1907. *Booneta* Distant, *Ann. Mag. nat. Hist.* (7) **19**: 291. Orthotype, *Cixius ferrugineus* Walker 1870 *J. Linn. soc. Lond.* (*Zool.*) **10**: 104.

Cixius caliginosus Walker and *C. luridus* Walker are congeneric, the former being synonymous with the type species.

Nelidia Stål

(FIG. 21)

1862. *Nelidia* Stål, Bidrag Rio Janeiro-trakt. Hemipt. 2, *K. svenska Vetensk. Akad. Handl.* **3**(6): 66. Haplotype, *Phrygia ancora* Stål. 1862 loc. cit.: 6.

Figures are given of a species in the British Museum near N. *ancora*. The tegminal venation is very similar to that of *Aneipo*.

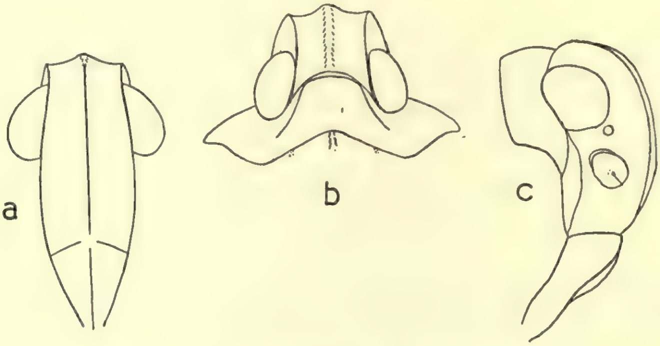

FIG. 21. *Nelidia sp.* near *ancora* Stål.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile.

FLATACHILUS gen. n.

Vertex approximately as wide at apex as long at sides, anterior margin subtransverse, very obtusely angulate at middle, lateral margins slightly converging apically, posterior margin deeply excavate, disk depressed except for a prominent semicircular callus medially between middle and base, frons curved in profile, twice as long in middle line as broad, medially carinate, disk depressed, lateral margins obliquely foliate, clypeus convex, medially carinate. Pronotum large, disk elevated, anteriorly strongly convex, median carina absent, lateral carinae strongly sinuate, reaching hind margin near tegulae; mesonotum large, carinae obsolete or weak. Post-tibiae with a single spine just distad of middle. Abdomen markedly depressed. Tegmina large, tectiform, widest at apex, anterior margin slightly convex, apical margin subtruncate, sutural margin almost straight, base of costal margin reflected upward, costal cell wider than clavus, Sc+R+M forking about one-sixth from base, Sc+R forking about one-third from base, M forked near middle of tegmen, Cu forked at about same level as Sc+R, Sc giving off six oblique veins to costa before node, one at node, and five to margin beyond it, R forked near apex with two branches at margin, M with seven branches at margin, Cu1a with two, Cu1b with two; clavus terminating slightly distad of middle of tegmen, no distinct nodal line, apical transverse line close to margin, apical areoles of R and M little broader than long. Wings with Sc simple, R with two branches, M with three, Cu1 with four.

Anal segment of female elongate-ovate, broadest near base; setose; a pair of short setose appendages ventrally on tenth segment. Ovipositor with third valvulae subquadrate with dorsal and ventral margins convex, a small membranous lobe at apex. Bursa copulatrix with a single multidentate sclerotized plate.

Type species, *Poeciloptera diffinis* Walker.

Flatachilus diffinis (Walker) comb. n.

(FIG. 22)

1858. *Poeciloptera diffinis* Walker, *Insecta Saundersiana, Hom.*: 57.

White. Tegmina white marked with about eleven small black spots on corium and about seven in membrane close to margin.

Ovipositor with first valvulae with dorsal limb sclerotized, bearing five teeth, the apical tooth longest, ventral limb membranous, deeply bifid, each ramus deeply cleft into two slender lobes, a slight sclerotization in basal portion of limb, third valvulae with membranous apical lobe vertical, elongate-triangular. Bursa copulatrix ornamented with a system of thin-walled rings closely grouped, a single circular sclerotized plate, domed on haemocoelic surface, dentate on luminal surface, a few anterior teeth oblique, much longer than remainder.

Redescribed from Walker's type and from one female taken by A. M. Moss, Para, Brazil (Rothschild Bequest, Brit. Mus. 1939–41). The general facies of the head and thorax is that of the Achilini rather than of the Elidipterini, while the venation, though reminiscent of that of *Myconus*, is also of Achiline pattern.

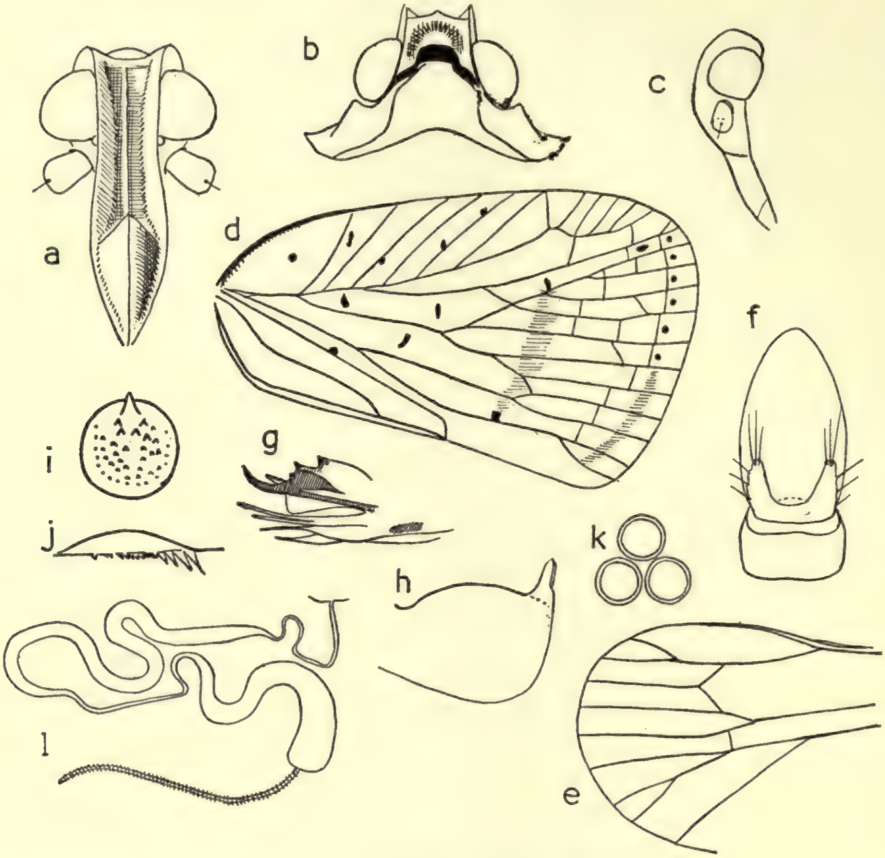

FIG. 22. *Flatachilus diffinis* (Walker).

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of wing; *f*, anal segment of female, ventral view; *g*, first valvula, lateral view; *h*, third valvula, lateral view; *i*, *j*, ventral and lateral views of sclerite in bursa copulatrix; *k*, ornamentation of bursa copulatrix; *l*, spermatheca (semi-diagrammatic).

Catonidia Uhler

1896. *Catonidia* Uhler, *Proc. U.S. nat. Mus.* **19**:281. Haplotype, *Catonidia sobrina* Uhler, *Proc. U.S. nat. Mus.* **19**: 282.

1907. *Ouwea* Distant, *Ann. Mag. nat. Hist.* (7) **19**:292; syn. n.

1928. *Spendon* Jacobi, *Ark. Zool.* **19** A, no. 28; 26; syn. n.

The writer has examined the type of *Ouwea doddi* Dist. and was unable to separate it from *C. sobrina* Uhler on the external characters used. The two are undoubtedly congeneric. *Spendon* Jacobi (orthotype *Spendon flavonotatus* Jacobi) is also congeneric, and it is probable that it is conspecific with *doddi* Distant. The last two genera must accordingly be suppressed as synonyms of *Catonidia*.

Aneipo Kirkaldy

1906. *Aneipo* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1** (9): 425. Haplotype, *Aneipo diva* Kirk. ibid.: 425.

1907. *Tudea* Distant, *Ann. Mag. nat. Hist.* (7) **19**: 290. Orthotype, *Tudea picturata* Dist. ibid.: 290.

The striking colour pattern of members of this genus is unique in Achilidae. A transition from regular to irregular venation in the tegmina occurs between species in this genus.

BUNDUICA Jacobi

1909. *Bunduica* Jacobi, Michaelsen, and Hartmeyer, in Fauna S.W. Austral. Homopt., *Ergebnisse Hamburg. Süd-west-australischen Forschungsreise* 1905, **2**:345. Haplotype, *Bunduica rubrovenosa* Jac.

Bunduica rubrovenosa Jacobi

(Fig. 23)

1909. *Bunduica rubrovenosa* Jacobi, loc. cit.: 345.

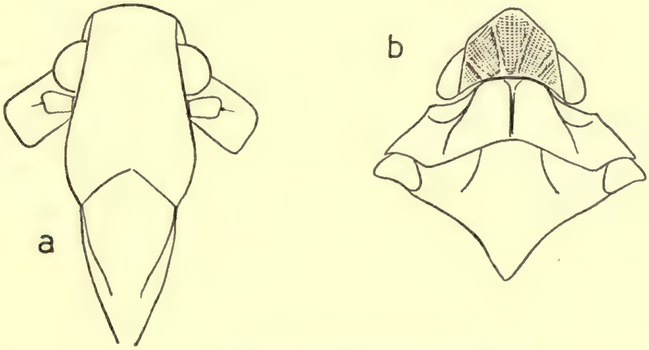

Fig. 23. *Bunduica rubrovenosa* Jacobi.
a, frons and clypeus; *b*, vertex, pronotum, and mesonotum (after Jacobi).

The figures are after Jacobi. This genus appears to be isolated, and without examination of the type species it cannot be placed, even tribally, with confidence.

Tribe APATESONINI

Vertex transverse, as pronotum with anterior margin straight or concave, frons depressed, medially ecarinate or median carina obsolete or absent, lateral margins foliate, continuing along clypeus almost to meet at apex; pronotum short, overlapped by eyes, mesonotum with disk clearly separated from sides by lateral carinae. Post-tibiae with one spine at middle. Tegmina tectiform, apically sinuate or subtruncate, Sc usually with a long anterior branch obliquely across costal cell, which is broad.

Key to Genera of Apatesonini

1 (2) Vertex not medially carinate, anterior margin transverse or very shallowly convex, length of vertex and pronotum together one-quarter length of mesonotum, tegmina with costa remote from margin near base *Sevia* Stål

2 (1) Vertex medially carinate, anterior margin distinctly convex or concave, length of vertex and pronotum together not as above, tegmina with costa along anterior margin basally 3

3 (4) Vertex much shorter in middle line than at sides, anterior margin very shallowly concave, frons with median carina obsolete, lateral carinae foliate or prominent, clypeus not strongly reflexed below thorax . . 5

4 (3) Vertex longer in middle line than at sides, anterior margin subrectangularly convex, frons with median carina more prominent than lateral carinae, clypeus strongly reflexed below thorax; combined length of vertex and pronotum about one-half that of mesonotum . . *Achilla* Hagl.

5 (6) Vertex almost completely covering pronotum laterally, tegmina with apical margin excavate in M . . . . . . *Apateson* Fowler

6 (5) Vertex not nearly covering pronotum laterally, tegmina with apical margin entire . . . . *Ilva* Stål

SEVIA Stål

1862. *Diacira* Stål, Bidrag Rio Janeiro-trakt. Hemipt. **2**, *K. svenska Vetensk. Akad. Handl.* **3** (6):3. (*nom. praeocc.*).

1866. *Sevia* Stål, *Hem. Afr.* **4**:181. Logotype *Diacira moerens* Stål.

1938. *Ateson* Metcalf, *Bull. Mus. comp. Zool. Harv.* **82** (5):369. Orthotype, *A. marmoratum* Metc. (= S. *bicarinata* F.) ibid. 370.

Sevia moerens Stål

Fig. 24

1862. *Sevia moerens* Stål, loc. cit.:3.

Female: length, 8·0 mm.; tegmina, 13·0 mm.

Vertex devoid of median carina, frons medially carinate at base, clypeus broadly raised along middle line, lateral carinae of frons and clypeus foliate meeting at apex of clypeus, rostrum with subapical segment longer than apical, antennae exposed dorsally with second segment ovoid, ocelli not touching margin of eyes, pronotum with ventral margin of lateral fields angulate and oblique; mesonotum distinctly tricarinate, about four times as long as combined length of vertex and pronotum. Pro-tibiae longer than pro-femora and trochanters, post-tibiae with a single spine at middle. Tegmina with clavus terminating at middle or very slightly distad of middle. Cu1 forking distad of Sc+R fork.

The above summary of generic characters and the figures are based on Stål's type.

The type species and *intermaculata* Stål (Fig. 25), a closely allied species, appear to have been rarely collected. On external characters it is not possible to separate

S. bicarinata F. (*Flata*) from *Ateson marmoratum* Metcalf and it is considered that the latter must fall into synonymy with the Fabrician species. The type species and other species of *Ateson* seen by the writer (which include all the described and one or two undescribed species) agree with the type species of *Sevia* in all significant external characters except size. Close comparison of the genitalia of both sexes between *S. moerens* and *S. bicarinata* may possibly reveal characters on which *Sevia* can naturally be divided, but on present evidence *Ateson* cannot be kept apart, and is here regarded as a subgenus which includes the smaller species.

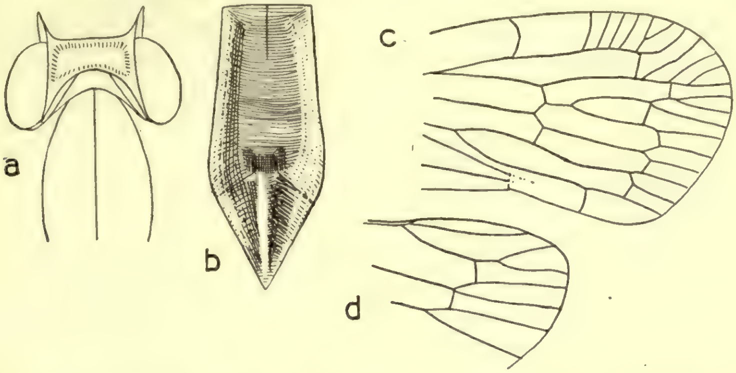

FIG. 24. *Sevia moerens* Stål.
a, vertex and pronotum; *b*, frons and clypeus; *c*, apex of tegmen; *d*, apex of wing

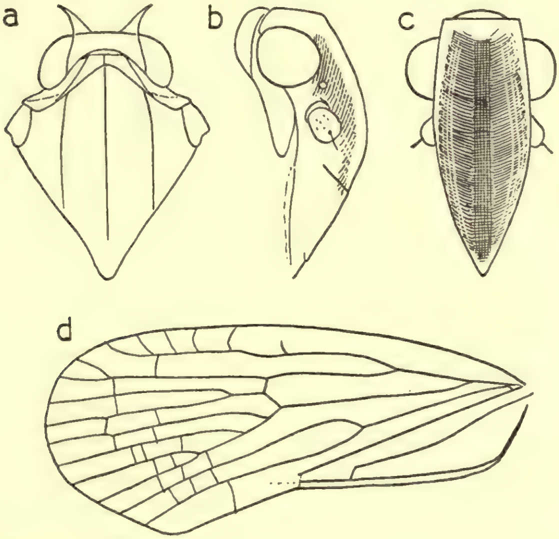

FIG. 25. *Sevia intermaculata* Stål.
a, vertex, pronotum, and mesonotum; *b*, head in profile; *c*, frons and clypeus; *d*, tegmen.

ACHILLA Haglund

1899. *Achilla* Haglund, *Öfvers. Vetensk. Akad. Förh. Stockh.* **56**:62. Haplotype, *Achilla marginatifrons* Haglund ibid.:63.

The characters of the type species are somewhat divergent from those of the remainder of the tribe. Anterior margin of vertex obscure, a strong median carina from base of vertex to apex of clypeus, clypeus short, antennae small, pronotum short. Tegmina with M1, M1a, M2, M3+4.

APATESON Fowler

1900. *Apateson* Fowler, *Biol. cent. Amer. Rhynch.-Hom.* **1**:70, pl. 8, figs. 15, *a*. Haplotype, *Apateson albomaculatum* Fowler ibid.

This monotypic genus appears to be confined to Central America.

ILVA Stål

1866. *Ilva* Stål, *Hem. Afr.* **4**:183. Haplotype, *Ilva nigrosignata* Stål.

Ilva nigrosignata Stål

(FIG. 26)

1866. *Ilva nigrosignata* Stål, loc. cit.:183.

Length, 6·5 mm.; tegmen, 10·0 mm.

Vertex more than three times as broad as long, with median carina weak, most distinct at base, frons medially carinate, lateral carinae obliquely foliate, clypeus broadly raised along middle line, lateral margins obliquely foliate, rostrum with subapical segment longer than apical (1·7:1), antennae exposed dorsally, second segment subglobose, ocelli not touching margin of eyes, eyes not covering pronotum

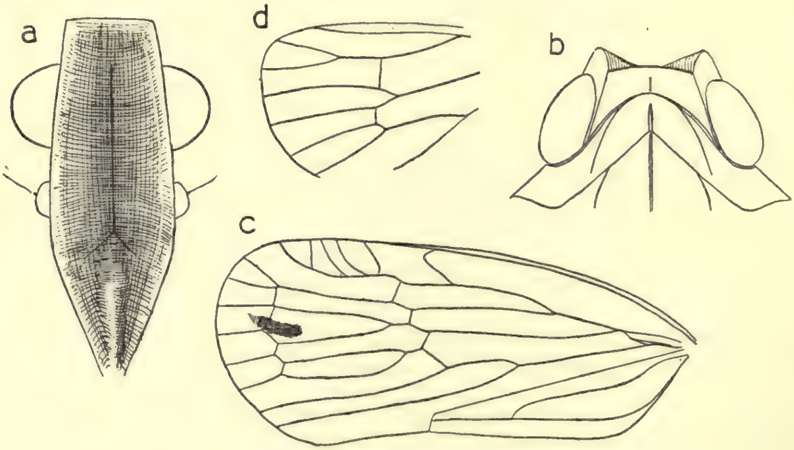

FIG. 26. *Ilva nigrosignata* Stål.
a, frons and clypeus; *b*, vertex and pronotum; *c*, tegmen; *d*, apex of wing.

laterally; pronotum moderately short, ventral margins of lateral fields angulate and oblique; mesonotum longer than vertex and pronotum together, distinctly tricarinate. Pro-tibiae distinctly longer than femora and trochanters combined, post-tibiae with a single spine distad of middle. Tegmina with apical margin shallowly rounded, clavus terminating distad of middle, Sc, R, and M scarcely forming a common stalk basally, Sc+R and Cu1 forked basad of middle of tegmen, Cu1 forking slightly distad of Sc+R fork.

The redescription and figures are based on Stål's type.

The type species is known only from the Cameroons.

TRIBE PLECTODERINI

Vertex at least two-thirds as wide as pronotum, anterior margin convex or angulately produced at middle, tegmina shallowly rounded over dorsum and with membranous areas overlapping when folded, apical margin strongly convex, venation regular, Sc with anterior branch short, sometimes recurved, usually six subapical and eight or nine apical areoles; post-tibiae unispinose.

The members of this tribe are small and for the most part coloured in shades of brown.

KEY TO GENERA OF PLECTODERINI

1 (2) Width of vertex measured at base of middle line at least twice length along middle; posterior margin not deeply excavate; vertex declivous or base of frons visible from above; frons relatively broad throughout; no areolets laterally between vertex and frons 3

2 (1) Width of vertex not twice length along middle; latero-apical areolets present or absent 39

3 (4) Vertex with apical margin broadly and more or less evenly rounded 5

4 (3) Vertex with anterior margin truncate or forming an obtuse angle at apex 11

5 (6) Vertex distinctly depressed just inside anterior margin, frons with two pale transverse bands . . . . *Pyrrhyllis* Kirk.

6 (5) Vertex not distinctly depressed just inside anterior margin . . 7

7 (8) Tegmina with vein Cu1b deeply curved mesad before transverse line, some veins in part foliately raised . . . . . . *Rupex* gen. n.

8 (7) Tegmina not as above, veins not foliately raised 9

9 (10) Frons strongly convex in profile, distinctly broader near level of antennae than at base; median carina obsolete basally; pronotum very short *Plectoderes* Spin.

10 (9) Frons shallowly convex in profile, scarcely broader near level of antennae than at base, median carina present basally, pronotum of moderate length . . . . *Caffropyrrhyllis* gen. n.[1]

11 (12) Vertex about six times as broad as long in middle; tegmina with parts of M, Cu, and claval veins foliately raised . . *Tropiphlepsia* Muir

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[1] The Chilean *Calerda* Signoret is separated from this genus by having the apical areoles of M not more than twice as long as broad.

12 (11) Vertex and tegmina not as above 13

13 (14) Frons with disk markedly impressed in apical third, with a transverse pallid band . . . . *Aristyllis* Kirk.

14 (13) Frons with disk not depressed, with two pallid transverse bands or none, rarely one 15

15 (16) Tegmina with Sc and R together with only three or four veins at margin, M1+2 forking at apical transverse line. Wings with R simple *Plectoderoides* Mats.

16 (15) Venation not as above 17

17 (18) Frons with two pallid transverse bands . . . . *Benella* Kirk.

18 (17) Frons devoid of such bands 19

19 (20) Pronotum not greatly constricted behind eyes, and more or less carinate between eye and tegula 21

20 (19) Pronotum greatly narrowed behind eyes, not carinate between eye and tegula 25

21 (22) Subcosta in tegmina with nine branches at margin; frontal and clypeal margins raised in a single unbroken curve, rostrum scarcely reaching post-trochanters . . . . *Kosalya* Dist.

22 (21) Subcosta with less than nine branches at margin, frontal and clypeal margins not as above 23

23 (24) Median carina of pronotum longer than that of vertex, lateral carinae of pronotal disk straight . . . . . . *Phypia* Stål

24 (23) Median carina of pronotum not longer than that of vertex, lateral carinae of pronotal disk concave . . . . . *Kawanda* gen. n.

25 (26) Vertex not more than twice as broad as long in middle, apex of clavus not distad of middle of tegmen . . . . . *Amblycratus* Uhl.

26 (25) Vertex more than twice as broad as long in middle, apex of clavus slightly exceeding middle of tegmen 27

27 (28) Width of frons at base exceeding three-quarters of width at its widest part 29

28 (27) Basal width of frons not three-quarters of its greatest width . . 35

29 (30) Frons longer than broad, 1·6:1 31

30 (29) Frons relatively shorter 33

31 (32) A transverse callus between frons and vertex; lateral carinae of pronotal disk not attaining hind margin . . . . *Agandecca.* White

32 (31) No such callus present, lateral carinae of pronotal disk attaining hind margin . . . . *Plectoringa* gen. n.

33 (34) Frons about 1·1 times as long as broad . *Hemiplectoderes* gen. n.

34 (33) Frons relatively longer, length to width about 1·4:1 *Rhinocolura* gen. n.

35 (36) Lateral discal carinae of pronotum not reaching hind margin *Abas* gen. n.

36 (35) Lateral discal carinae of pronotum reaching hind margin . . 37

37 (38) Lateral margins of frons sinuate; median carina of pronotum half length of lateral discal carinae; mesonotum posteriorly depressed *Paragandecca* gen. n.

38 (37) Lateral margins of frons not sinuate, straight at base then convex; median

carina of pronotum less than a third of length of lateral discal carinae; mesonotum not depressed posteriorly . . *Prosagandecca* gen. n.

39 (40) Vertex devoid of a carina across apex, or with median carina prominent and apical transverse carina obsolete 41

40 (39) Vertex with one or more distinct carinae at apex 53

41 (42) Vertex four times as long as wide at base, median carina prominent, subfoliate . . . . *Chroneba* Stål

42 (41) Vertex not as above 43

43 (44) Lateral margins of vertex slightly concave, vertex about as wide at apex as at base 45

44 (43) Vertex not as above; tegmina with M1+2 forked before distal row of transverse veins 51

45 (46) Width of clypeus at base exceeding width of frons at base . . 47

46 (45) Width of clypeus at base equal to width of frons at base . . 49

47 (48) Lateral discal carinae of pronotum curved laterad, not reaching hind margin *Tangina* Mel.

48 (47) Lateral discal carinae of pronotum short, reaching hind margin *Paraclusivius* gen. n.

49 (50) Vertex as long as broad across base . . . . *Clusivius* Dist.

50 (49) Vertex 1·3 times as broad across base as long in middle line *Phrygia* Stål

51 (52) Vertex distinctly longer than broad; frontoclypeal suture deeply impressed; rostrum attaining post-trochanters, pronotum punctate on each side of middle line; post-tibial spine at middle . . *Parakosalya* Dist.

52 (51) Vertex not distinctly longer than broad; frontoclypeal suture not at all impressed; rostrum scarcely reaching to post-trochanters; pronotum not punctate on each side of middle line; post-tibial spine basad of middle *Akotropis* Mats.

53 (54) Vertex with a single distinct carina across apex 55

54 (53) Vertex with two or more transverse carinae at apex, usually enclosing a more or less distinct triangular facet on each side at base of frons; rarely a callus in place of such facets 99

55 (56) Vertex longer in middle line than broad at its base by at least 1·5:1 57

56 (55) Vertex relatively shorter 61

57 (58) Pronotum with supernumerary carinae enclosing areolets on each side outside disk; tegmina with two or three callosities in apical cells of Sc and R 59

58 (57) Pronotum devoid of such carinae and areolets; tegmina without callosities in apical cells . . . . *Callichlamys* Kirk.

59 (60) Vertex flat, 1·5 times as long as greatest width; a horizontal carina between eye and lateral margin of frons . . . . *Koloptera* Metc.

60 (59) Vertex hollowed out, fully twice as long as wide, no carina across gena *Kardopocephalus* Metc.

61 (62) Vertex declivous, anterior marginal carina acutely angulate at apex, base of frons visible in dorsal view . . . . . *Spino* gen. n.

62 (61) Vertex usually not declivous, anterior marginal carina strongly present,

not forming an acute angle at apex, base of frons not visible in dorsal view 63

63 (64) Vertex elongate-triangular, transverse or bluntly rounded at apex, produced before eyes for about half their length, disk strongly impressed, median carina of frons not visible in dorsal view 65

64 (63) Vertex five- or six-sided, not produced before eyes for more than half their length, usually less, anterior and posterior margins subangulate, median carina of frons visible in dorsal view 77

65 (66) Lateral carinae of frons foliate at their junction basally, raised much above disk, frons not carinate in basal half, or weakly so; tegmina with a large round callus in costal cell near node . . . . *Deferunda* Dist.

66 (65) Lateral carinae of frons not foliate at junction basally, not much raised above disk, frons distinctly carinate in basal half; tegmina devoid of callus at stigma 67

67 (68) Frons not nearly twice as long as broad, vertex about as long medially as broad at base of median carina, lateral carinae of pronotal disk shallowly concave, apical areoles R_1, R_s, and M_1 in tegmen indented, apex of branches of Sc white, a spot in cells R_2 and M_1 . . *Paratangia* Mel.

68 (67) Not as above 69

69 (70) Vertex produced before eyes for one- to two-thirds length of eye, in profile meeting frons at an acute angle; lateral carinae of frons almost meeting in an acute point at base, not as eminent as median carina. M1+2 in tegmina not forked before subapical line of transverse veins . 71

70 (69) Vertex produced before eyes for scarcely half their length, in profile not meeting frons in an acute angle, lateral carinae of frons more prominent than median carina, not meeting basally 75

71 (72) Pronotum with supernumerary carinae and areolets outside disk *Betatropis* Mats.

72 (71) Pronotum without areolets laterad of disk 73

73 (74) Posterior margin of vertex excavate . . . . . *Epirama* Mel.

74 (73) Posterior margin of vertex truncate . . . . *Callichlamys* Kirk.

75 (76) Vertex truncate at base; lateral discal carinae of pronotum not more than 1·5 times length of median carina; tegmina with M1+2 not forked before subapical transverse line . . . . . *Caristianus* Dist.

76 (75) Vertex widely excavate at base; lateral discal carinae of pronotum fully twice as long as median carina; tegmina with M1+2 forked a little before subapical transverse line . . . . . *Kurandella* gen. n.

77 (78) Median carina of vertex at base as high as lateral margins or nearly so, median carina of pronotum usually only a little shorter than lateral discal carinae; tegulae curved, not carinate 79

78 (77) Median carina of vertex, if present, weak; disk of vertex distinctly depressed, without an impression on each side of middle line, tegulae often carinate or strongly angulately bent 85

79 (80) Median carina of vertex distinct at apex; pronotum very narrow behind eyes 81

80 (79) Median carina of vertex obsolete or absent apically; pronotum not narrow behind eyes 83

81 (82) Lateral carinae of pronotal disk twice length of median carina *Momar* gen. n.

82 (81) Lateral carinae of pronotal disk not exceeding 1·5 times length of median carina . . . . *Catonoides* Metc.

83 (84) Vertex acutely angulate at apex; anterior margin of pronotal disk not more than one half of its width across basal margin . . *Salemina* Kirk.

84 (83) Vertex very obtusely angulate at apex; anterior margin of pronotal disk fully three-quarters of its width across basal margin *Cionoderella* gen. n.

85 (86) Vertex deeply impressed in middle of disk, obsoletely carinate medially at base; median carina of pronotum one-half as long as lateral carinae of disk 87

86 (85) Vertex, if impressed, not deeply so; median carina of pronotum one-third as long as lateral carinae 91

87 (88) Pronotum with a series of areolets laterad of disk; tegmina with M1+2 forked at apical transverse line . . . . . *Francesca* Kirk.

88 (87) Pronotum without such areolets; tegmina with M1+2 forked just distad of level of stigma 89

89 (90) Vertex acute apically, posteriorly acutely excavate, carinae of head subfoliate; lateral carinae of pronotal disk convex, short; tegmina with most apical areolets of M half as long as subapical *Moraballia* gen. n.

90 (89) Vertex very obtuse apically, posterior margin parallel to anterior, disk as deeply sunken as long in middle line, median carina of frons not foliate; lateral carinae of pronotal disk long and concave; tegmina with most apical areolets of M more than half length of subapical *Bathycephala* gen. n.

91 (92) Anterior third of mesonotal disk separated by a transverse ridge of callus from posterior two-thirds, this portion and part of lateral fields of a finer surface texture; pronotum with four indefinite areolets on each side *Kempiana* Muir

92 (91) Mesonotal disk of homogeneous texture; no areolets on pronotum . 93

93 (94) Vertex ecarinate; lateral carinae of pronotal disk concave *Lanuvia* Stål

94 (93) Vertex distinctly medially carinate, at least basally 95

95 (96) Lateral carinae of pronotal disk concave . . *Paracatonia* gen. n.

96 (95) Lateral carinae of pronotal disk convex 97

97 (98) Frons scarcely 1·3 times longer than broad; vertex forming angle of 130° at apex; tegmina with cell M_1 scarcely twice as long as broad *Mahuna* Dist.

98 (97) Frons about 1·5 times longer than broad; vertex forming angle of 155° at apex; tegmina with cell M_1 2·5 times as long as broad at base *Mlanjella* gen. n.

99 (100) Latero-apical triangular facets of vertex feebly demarcated on their frontal margin, each traversed horizontally by a short carina arising from lateral margin 101

100 (99) Latero-apical facets, whether distinct or feebly developed, not traversed horizontally by a carina 103

101 (102) Frons broader than long; antennae with second segment elongate-ovate, extending laterad of eyes; pronotal disk minute, vertical foliate expansions on certain tegminal veins; R, M, and Cu1a converging almost to meet at nodal line . . . . *Haitiana* Doz.

102 (101) Frons longer than broad; antennae, pronotal disk, and tegminal veins not as above . . . . *Eurynomeus* Kirk.

103 (104) Vertex markedly elongate 105

104 (103) Vertex relatively short 107

105 (106) Lateral margins of vertex strongly foliate, posterior margin almost level with anterior margin of eyes; lateral carinae of pronotal disk foliate *Pseudhelicoptera* Fowl.

106 (105) Lateral margins of vertex not foliate, posterior margin not level with anterior margin of eyes . . . . . *Remosachilus* gen. n.

107 (108) Latero-apical facets of vertex obscure, a broad callus in their place 109

108 (107) Latero-apical facets of vertex not replaced by callus . . . 111

109 (110) Lateral carinae of pronotal disk concave . . *Agandecca* White

110 (109) Lateral carinae of pronotal disk convex . . . *Aphypia* Mel.

111 (112) Vertex 1·3 times longer in middle line than wide at its base; latero-apical facets of vertex very small, frons three times as wide at widest part as at base . . . . *Hamba* Dist.

112 (111) Vertex not so relatively long 113

113 (114) Vertex distinctly medially carinate throughout, disk scarcely depressed, if at all, lateral margins of vertex not subfoliate or raised higher than median carina 115

114 (113) Vertex not medially carinate or only strongly so in basal half, when lateral margins are somewhat raised 133

115 (116) Frons broader than long in middle line; pronotum with five areolets laterally; tegmina with Cu1b abruptly and deeply curved near level of apex of clavus, corium granulate 117

116 (115) Frons not broader than long; tegmina with Cu1b not deeply curved 119

117 (118) Frons broader than long (1·3:1); vertex with latero-apical facets large, extending caudad for at least one-third of length of vertex; tegmina with apical cells of M distinctly longer than subapical, veins in membrane not granulate . . . . *Taloka* Dist.

118 (117) Frons broader than long, scarcely 1·2:1; vertex with latero-apical facets minute, occupying one-fifth of lateral margin; tegmina with apical cells of M distinctly shorter than subapical, veins in membrane strongly granulate . . . . *Gordiacea* Metc.

119 (120) Pronotum not markedly narrow or constricted behind eyes, usually devoid of areolets outside disk, lateral discal carinae not concave, not twice as long as median carina of pronotum . . . 121

120 (119) Pronotum much narrowed or constricted behind eyes, usually with areolets, lateral discal carinae concave, at least twice as long as median carina 129

121 (122) Vertex curving downward anteriorly; lateral discal carinae of pronotum strongly convex, median pronotal carina not nearly half length of middle line of vertex; tegmina with apical cells of M subequal to subapical cells or longer . . . . *Cythna* Kirk.

122 (121) Vertex with disk in one plane; lateral discal carinae of pronotum straight, oblique; tegmina with apical cells of M not nearly as long as subapical 123

123 (124) Median carina of pronotum distinctly more than half length of middle line of vertex; apex of clavus distinctly distad of middle of tegmen 125

124 (123) Median pronotal carina not distinctly more than half length of middle line of vertex; apex of clavus not distad of middle of tegmen . 127

125 (126) Disk of pronotum not at all elevated, no impressed areolets laterad of disk; tegmina with Sc and R forking much basad of node, with six or seven branches at apex . . . . . . *Usana* Dist.

126 (125) Disk of pronotum slightly elevated, areolets present laterad of disk, tegmina with Sc and R forking close to node, with four branches at apex . . . . *Opsiplanon* Fenn.

127 (128) Length of median carina of pronotum less than half that of vertex; rostrum not very short; tegmina with apex of clavus distinctly basad of middle . . . . *Ballomarius* Jacobi

128 (127) Length of median carina of pronotum half that of vertex; rostrum very short; tegmina with apex of clavus at middle *Epiusana* gen. n.

129 (130) Anterior half of vertex in profile straight, rectangulately meeting frons *Phenelia* Kirk.

130 (129) Anterior half of vertex in profile slightly decurved, almost rounding into frons at apex 131

131 (132) Latero-apical facets of vertex as broad as long or broader; pronotum devoid of areolets; anterior margin of pronotal disk transverse *Nephelia* Kirk.

132 (131) Latero-apical facets of vertex longer than broad; pronotum with areolets laterad of disk, if feeble; anterior margin of pronotal disk convex. *Argeleusa* Kirk.

133 (134) Vertex transverse at apex, latero-apical facets minute, making outline of vertex subrectangular, lateral discal carinae of pronotum straight, reaching hind margin, not twice length of median carina *Callinesia* Kirk.

134 (133) Vertex acutely rounded or angulate at apex, five- or six-sided, or conical in outline 135

135 (136) Tegmina with M1+2 not forked before apical transverse line *Cnidus* Stål

136 (135) Tegmina with M1+2 forked before apical transverse line . . 137

137 (138) Latero-apical facets of vertex subvertical, scarcely visible in dorsal view; pronotum devoid of areolets outside disk, lateral carinae of disk twice as long as median carina; mesonotum with a transverse callus on anterior third of disk . . . . . . *Magadha* Dist.

138 (137) Latero-apical facets of vertex oblique, largely visible in dorsal view; pronotum with areolets laterad of disk, lateral carinae of disk three times as long as median carina; mesonotum without a transverse callus on disk . . . . *Catonia* Uhl.

CALERDA Signoret

1863. *Calerda* Signoret, *Ann. Soc. ent. Fr.* **4** (3):583. Haplotype, *Calerda biocellata* Signoret.

Head with eyes not quite as wide as pronotum. Vertex transverse, about 1·8 times as broad as long, apparent anterior margin in dorsal view shallowly convex, vertex rounding into frons, devoid of anterior marginal carina. Frons strongly convex, devoid of median carina, lateral margins strongly produced laterally; frontoclypeal suture excavate, clypeus convex, medially carinate. Antennae globose, ocelli approximated to lateral carinae of frons; rostrum reaching to post-coxae. Pronotum very short, median carina weak; mesonotum tricarinate, almost as long as wide. Hind tibiae devoid of spines.

Tegmina narrow, Sc+R and Cu1 apparently forking about level with apex of clavus, apical areoles short, about twice as long as broad, rather less than half as long as subapical.

Calerda biocellata Signoret

1863. *Calerda biocellata* Signoret, loc. cit.:584.

Length to apex of tegmina, 3 mm.

Yellowish; two spots on disk of vertex near hind margin, frons except in middle line black; mesonotum with exception of carinae fuscous-piceous. Tarsi yellowish. Abdomen testaceous mottled fuscous. Tegmina translucent, veins brownish.

The description and figure accord reasonably well in general characters with members of the *Plectoderes* group. While the head is like that of *Plectoderes*, *Calerda* is kept apart by the comparatively long pronotum and by the latter distinctly exceeding the width of the head with eyes.

PYRRHYLLIS Kirkaldy

1906. *Pyrrhyllis* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1** (9):420. Haplotype, *Pyrrhyllis pyrrhyllis* Kirkaldy, ibid.:421.

Vertex broader than long (4:1), anterior margin shallowly convex, posterior margin shallowly excavate, disk declivous, depressed inside anterior margin, medially carinate except at apex, frons convex, as long in middle line as broad, median carina fine, absent at base, lateral margins gradually diverging to below level of antennae, foliately expanded laterally. Clypeus short, laterally carinate, median carina absent, rostrum with apical joint shorter than subapical, antennae sunk in a slight depression, but not roofed over above, subglobose, ocelli just touching eyes; eyes not overlapping pronotum so as almost to cover it, pronotum moderately short, lateral margin short, no carina between eye and tegula, ventral margins of lateral pronotal fields subangulately rounded and oblique; median carina one-third length of lateral discal carinae, latter straight or convex; mesonotum longer than vertex and pronotum together, distinctly tricarinate, tegulae not carinate, pro-tibiae shorter than femora with trochanters, post-tibiae with a single spine basad of middle. Tegmina with Sc+R forking distad of fork of Cu1, Sc with two branches, R with two, M_1 forked at level of nodal transverse line, clavus terminating at middle of tegmen.

Pyrrhyllis laevifrons (Walker) comb. n.

(Fig. 27)

1858. *Cixius laevifrons* Walker, *Insecta Saundersiana Hom.*: 43.

The figures are of Walker's holotype. As far as is at present known the genus is Australian.

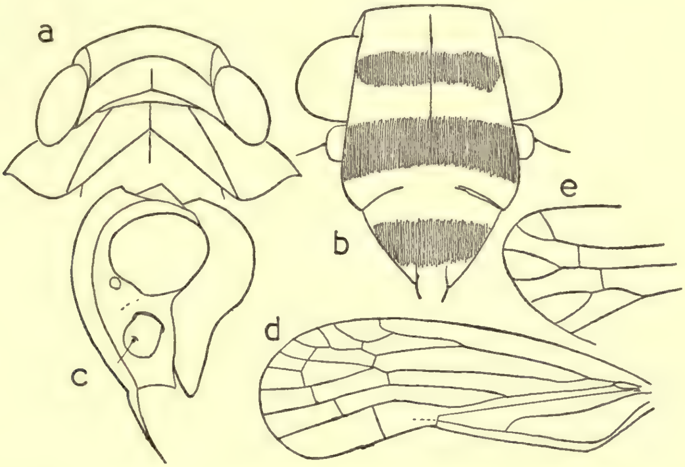

Fig. 27. *Pyrrhyllis laevifrons* (Walker).
a, vertex and pronotum; *b*, frons and clypeus; *c*, head in profile; *d*, tegmen; *e*, apex of wing.

PLECTODERES Spinola

1839. *Plectoderes* Spinola, *Ann. Soc. ent. Fr.* **8**: 328. Haplotype, *Flata collaris* Coquebert 1801 *Ill. Icon. Ins.* **2**: 79; pl. 18, figs. 11a–d.

Head with eyes almost as wide as pronotum.

Vertex broader than long (3:1), anterior margin shallowly convex, separated from frons by a very slender carina, median carina complete; frons longer than broad (1·1:1), very convex in profile, medially carinate except in basal third, lateral margins strongly produced laterally, clypeus subequilaterally triangular, straight in profile or nearly so, carinate medially and laterally, rostrum with apical segment longer than subapical or about equal, attaining post-coxae in female, antennae subglobose, sunk in a deep depression, ocelli distinctly separated from eyes. Pronotum very short, laterally in form of a thin subvertical plate, almost completely covered by hind margin of eyes, ventral margin of lateral pronotal fields angulate and oblique, disk finely tricarinate; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate, pro-tibiae longer than femora, post-tibiae with a single spine basad of middle. Tegmina with Sc+R fork about level with Cu1 fork, Sc with 4–6 cells at apex, rather crowded. Clavus terminating distad of middle of tegmen.

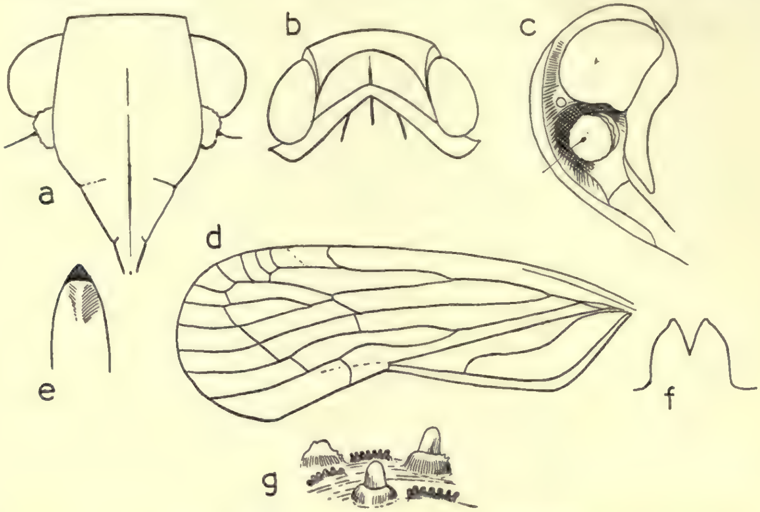

FIG. 28. *Plectoderes collaris* Coquebert.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of anal segment of male, dorsal view; *f*, medioventral process of pygofer; *g*, ornamentation on surface of bursa copulatrix.

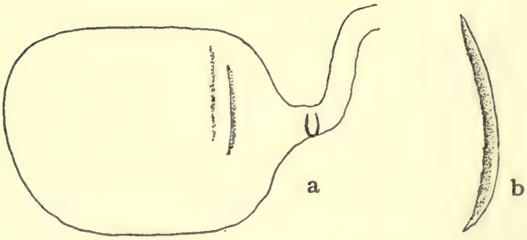

FIG. 29. *Plectoderes basalis* Fowler.

a, bursa copulatrix; *b*, one of shagreen tracts in wall (enlarged), both figures semi-diagrammatic.

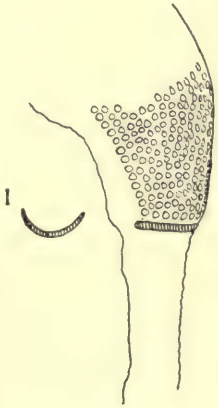

FIG. 30. *Plectoderes flavovittatus* Fowler.

Entrance to bursa copulatrix with (I) dorsal view of sclerite at entrance.

In addition to the above characters the base of the frons is punctate. The figures of *Plectoderes scapularis* Metcalf given by Metcalf (1938, pls. x, xvi, xxii) justify his view that this species stands apart from *P. collaris* in characters of generic value. Until further material is available for comparison with the single specimen on which *scapularis* is based, the significance of its unusual venation must remain uncertain. For the present the writer makes this species the type of **Plectoderella**, a new subgenus of *Plectoderes*, separated from the typical subgenus by the lateral carinae of the pronotal disk being four times as long as the median carina, and more markedly divergent laterad, and by the lateral carinae of the mesonotal disk diverging from apex to base: to these it may prove possible to add the forking of Sc+R near the base of the tegmina and the bifurcation of Cu1a and Cu1b after their separation. The writer regards the subgenus *Plectoderes* as containing only *Flata collaris* Coquebert (Fig. 28), *P. basalis* Fowler (Fig. 29), *P. montanus* Fowler, and *P. flavovittatus* Fowler (Fig. 30). *P. collaris* Coquebert in the male has the anal segment long and tubular; in *P. basalis* Fowler it is short. In *P. montanus* Fowler the frontoclypeal suture is deeply impressed and the lateral margins of the frons widely dilated; the frons is punctate from base to level of antennae, while the pronotum has four obsolete depressions on each side lateral of disk. On present evidence it would seem that the presence of a horseshoe-shaped sclerite at the entrance of the bursa copulatrix is a generic character.

RUPEX gen. n.

1904. *Plectoderes* (*pars*) Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**:110.
1938. *Messeis* Metcalf (not Stål), *Bull. Mus. comp. Zool. Harv.* **82** (5):372.

Head with eyes almost as wide as pronotum, vertex broader than long (3:1), anterior margin subangulately convex, separated from frons by a fine carina, median carina present except near apex, frons broad, convex in profile, medially carinate, clypeus subequilaterally triangular. Pronotum short, disk distinct, median carina not very much shorter than lateral discal carinae, pronotum laterad of disk not almost completely overlapped by eyes, hind portion not steeply inclined anteroventrad, with five obsolete ridges on each side; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate. Tegmina with Sc+R fork about level with fork of Cu1, Sc with two branches just before fork, clavus terminating distad of middle.

Type species, *Plectoderes asper* Fowler.

Rupex asper (Fowler)

(FIG. 31)

1904. *Plectoderes asper* Fowler, loc. cit.:110.

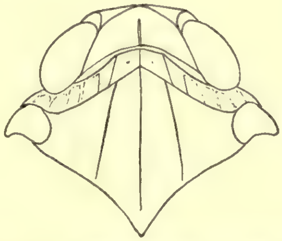

FIG. 31. *Rupex asper* (Fowler). Vertex, pronotum, and mesonotum.

This genus is distinguished from *Plectoderes* chiefly by the characters of the pronotum and of the tegmina. The medioventral process of the pygofer is bifid as in *Plectoderes*. The figure given is of Fowler's holotype.

MOMAR gen. n.

Head with eyes almost as wide as pronotum. Vertex across base at middle broader than long in middle line (1·7:1), medially carinate completely, anterior margin subangulately rounded, markedly convex, slightly produced before eyes, lateral margins straight, divergent basad, posterior margin angularly excavate, frons convex in profile, moderately broad, lateral margins somewhat diverging distally, median carina present throughout, lateral carinae produced laterally, clypeus medially and laterally carinate, apical joint of rostrum exceeding subapical joint, apex attaining meso-coxae only, antennae subglobose, not sunk deeply in a depression, ocelli not contiguous with eyes, eyes not entirely covering pronotum but much overlapping. Pronotum short, in middle line half length of vertex in same line, tricarinate, lateral carinae of disk straight, diverging to hind margin, each twice as long as median carina, lateral fields inclined anteroventrad; mesonotum about twice as long as vertex and pronotum combined, tricarinate, post-tibiae with a single spine basad of middle. Tegmina with Sc+R and Cu1 forked at about same level, just basad of apex of clavus, clavus terminating at middle of tegmen. Anal segment of male very short, medioventral process of pygofer semilunate, not bifid. First valvulae of ovipositor with four teeth, bursa copulatrix with faint annular ornamentation, three or four enlarged rings near entrance, these rings each with five tubercles on one side.

Type species, *Plectoderes lineatocollis* Fowler.

Momar lineatocollis (Fowler)

(Fig. 32)

1904. *Plectoderes lineatocollis* Fowler, loc. cit.: 111, pl. 11, figs. 26 *a*, *b*.

The figures are based on the holotype from Volcán de Chiriquí (Champion) and on a specimen of the opposite sex in the type series.

This genus is distinguished by the proportions of the frons and vertex, pronotum and medioventral process of the pygofer.

SPINO gen. n.

Head with eyes slightly narrower than pronotum. Vertex across base of middle broader than long in middle line (1·4:1), medially carinate except near apex, anterior margin finely carinate, forming an angle of 75° at apex, produced before eyes for about one-third of their length, lateral margins straight, diverging caudad, posterior margin excavate, re-entrant angle 130°; frons elongate, narrowed between eyes, convex in profile, medially and laterally carinate throughout, lateral margins sinuately diverging distally, antennae subovate, not sunk in a depression, ocelli not contiguous with eyes, eyes not entirely covering pronotum. Pronotum short, in middle line half as long as vertex in same line, lateral carinae of disk straight, diverging to hind margin, each 1·5 times as long as median carina, lateral fields somewhat inclined anteroventrad but not extensively overlapped by eyes; mesonotum tricarinate, about twice as long as vertex and pronotum combined; post-tibiae with a single spine basad of middle. Tegmina with clavus terminating about middle.

Type species, *Plectoderes notatus* Fowler.

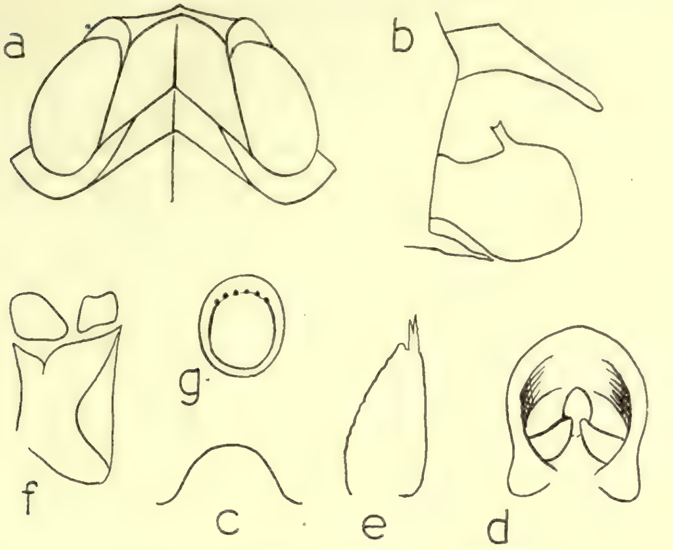

Fig. 32. *Momar lineatocollis* (Fowler).

a, vertex and pronotum; *b*, male genitalia, lateral view; *c*, medioventral process of pygofer; *d*, anal segment of male; *e*, ventral lobe of first valvula of ovipositor; *f*, sclerites in vagina; *g*, a single thickened ring from surface of bursa copulatrix near its base.

Spino notatus (Fowler)

(Fig. 33)

1904. *Plectoderes notatus* Fowler, loc. cit.: 110, pl. 11, fig. 23 *a*.

The figures are of Fowler's holotype. The genus is distinguished by the shape of the vertex and pronotum. *S. notatus* is relatively large.

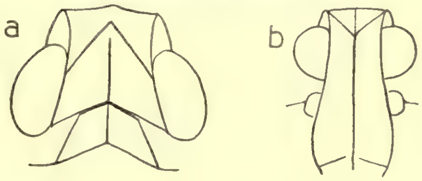

Fig. 33. *Spino notatus* (Fowler).

a, vertex and pronotum; *b*, frons.

PHYPIA Stål

1862. *Phypia* Stål, Bidrag Rio Janeiro-trakt. Hemipt. 2, *K. svenska Vetensk. Akad. Handl.* **3** (6): 65. Logotype, *Phrygia fuscoguttata* Stål.

1938. *Rhotella* Metcalf, *Bull. Mus. comp. Zool. Harv.* **82** (5): 375. Orthotype, *Rhotella punctata* Metc., ibid.

Head with eyes distinctly narrower than pronotum. Vertex across base broader than long in middle line (2·2:1), produced before eyes for four-tenths of their length, anterior margin carinate, forming an angle of 130° at apex, lateral margins diverging basad, posterior margin shallowly concave, median carina present; frons shallowly convex in profile, longer than broad (nearly 1·5:1), lateral margins slightly convex, diverging to below level of antennae, median carina present throughout, lateral marginal carinae slightly subfoliately produced laterally, clypeus laterally and medially carinate, rostrum with subapical joint shorter than apical, antennae subglobose, not deeply sunk in a depression, ocelli not contiguous with eyes, eyes not extensively covering pronotum. Pronotum relatively long, in middle line longer than vertex in same line (1·2:1), lateral carinae of disk prominent, straight, diverging to hind margin, each longer than median carina (1·7:1), pronotum laterad of disk moderately broad, not inclined anteroventrad, ventral margin of lateral fields oblique and angulate; mesonotum three times as long as vertex and pronotum combined, tricarinate; pro-tibiae about as long as pro-femora, post-tibiae with a single spine basad of middle. Tegmina with Sc+R forking slightly basad of Cu1 fork, Sc with two branches at margin distad of stigma, clavus terminating at middle of tegmen, medioventral process entire, strongly convex.

Phypia varinervis (Stål)

(Fig. 34)

1862. *Phrygia varinervis* Stål, loc. cit. **2**:5.

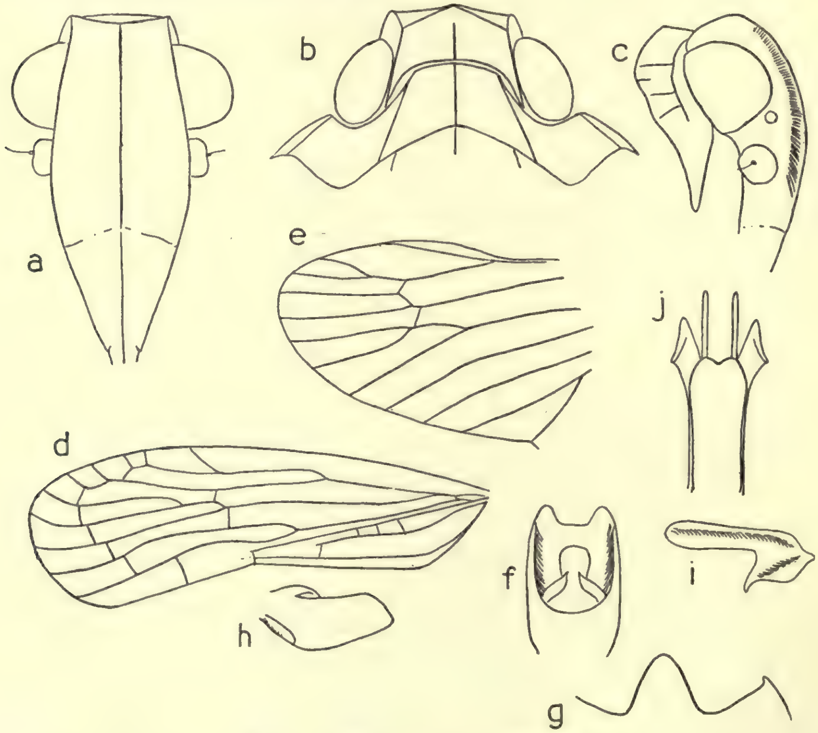

Fig. 34. *Phypia varinervis* (Stål).

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, wing; *f*, anal segment; *g*, posterior margin of pygofer; *h*, left genital style, lateral view; *i*, right genital style, dorsal view; *j*, aedeagus, ventral view.

In Stål's holotype the medioventral process of the pygofer is about as long as broad across the base. The genital styles are subovate in side view, and each has a small curved spine on its inner face, with a few small setae close to it. The anal segment is small and the latero-apical angles are rounded and produced.

Phypia punctata (Metcalf) comb. n.

1938. *Rhotella punctata* Metcalf, loc. cit.:375.

ABAS gen. n.

Head with eyes not as wide as pronotum. Vertex across base broader than long in middle line (2·3:1), produced before eyes for nearly half their length, finely carinate medially except near apex, disk slightly depressed, anterior margin angulately produced forming an angle of 147° at apex, lateral margins straight, diverging basad, posterior margin shallowly concave; frons moderately convex in profile, not quite twice as broad at widest part as at base, lateral margins distinctly diverging distally, incurved rather abruptly before suture, median carina prominent, present throughout, disk slightly hollowed out between middle line and margins, lateral margins carinate; clypeus short, medially and laterally carinate, antennae subovate, not sunk in a depression, eyes not covering pronotum but markedly overlapping. Pronotum short, in middle line two-fifths length of vertex in same line, lateral carinae of disk concave, long, diverging to behind eyes, each five times as long as median carina, pronotum laterad of disk moderately inclined anteroventrad; mesonotum longer than vertex and pronotum combined (3·8:1), tricarinate, carinae parallel; post-tibiae with a single spine basad of middle. Tegmina with Sc+R forking slightly basad of Cu1 fork, clavus terminating distad of middle of tegmen. Wings with cell R_1 short but longer than its stalk, M with two branches at margin.

Type species, *Abas unipunctatus* sp. n.

Abas unipunctatus sp. n.

(FIG. 35)

Female: length, 4·5 mm.; tegmen, 5·5 mm.

Stramineous, powdered white; a narrow band extending from below antennae on to anterior portion of lateral fields of pronotum, above eyes and across basal angles of vertex, and covering disk of pronotum and apex of mesonotal disk, piceous. Tegmina cretaceous with a spot near apex of clavus piceous, apical margin and distal half of apical areoles slightly infuscate. Wings smoky. Seventh sternite of ♀ as long as remainder of ventral surface of abdomen, posteriorly transverse-concave. Bursa copulatrix apparently unarmed, a flattened polygonal sclerite in wall of vagina. The other details are best shown by the figure.

Described from one female in the British Museum collected at Senahu, Vera Paz (Champion). The genus is distinguished by the shape of the margins of the frons and of the pronotal disk. The coloration seems to be unique in the tribe.

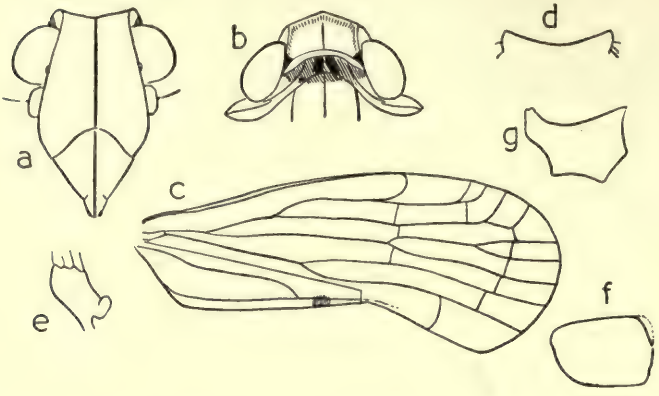

FIG. 35. *Abas unipunctatus* gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, tegmen; *d*, posterior margin of pregenital sternite of female; *e*, ventral lobe of first valvula of ovipositor; *f*, third valvula of ovipositor; *g*, sclerite in wall of vagina.

HEMIPLECTODERES gen. n.

Head with eyes not quite as wide as pronotum. Vertex across base broader than long in middle line (3:1), produced before eyes for a third of their length, medially carinate, disk slightly declivous, anterior margin angulately produced forming an angle of 130° at apex, lateral margins straight, diverging basad, posterior margin shallowly subangulately concave; frons as long as broad, moderately convex in profile, 1·3 times as broad at widest part as at base, lateral margins carinate, convex, diverging to just below level of antennae then incurved, median carina present throughout, disk not hollowed out longitudinally, distinctly punctate in basal quarter, clypeus moderately short, laterally and medially carinate, rostrum with apical and subapical joints approximately equal, antennae subglobose, not sunk in a depression, eyes not covering pronotum but markedly overlapping. Pronotum short, in middle line four-sevenths length of vertex in same line, tricarinate, lateral carinae of disk convex, diverging basad, each 3·5 times as long as median carina, anterior margin truncate, posterior margin angularly excavate, pronotum laterad of disk moderately inclined anteroventrad; mesonotum longer than vertex and pronotum combined, tricarinate; post-tibiae with a single spine basad of middle. Tegmina with Sc+R forking about level with fork of Cu1.

Anal segment of male very short, latero-apical angles lobate. Medioventral process of pygofer subtriangular.

Type species, *Hemiplectoderes trabeculatus* sp. n.

Hemiplectoderes trabeculatus sp. n.

(FIG. 36)

Male: length, 4·7 mm.; tegmen, 5·0 mm. Female: length, 4·8 mm.; tegmen, 5·0 mm.

Testaceous-fuscous, abdomen darker; a spot on lateral lobes of pronotum piceous. Tegmina fuscous, all cells of corium traversed by slender pallid bars giving appearance of transverse veinlets, about fifteen irregular rows of such bars on corium; transverse veins of membrane pallid. Wings smoky.

Medioventral process of pygofer fully as long as broad; genital styles with a large recurved lobe in middle of dorsal margin with a process directed inward from it. Phallobase with a lanceolate dorsal lobe, bifid at apex, a sclerotized process ventrally as shown in figures.

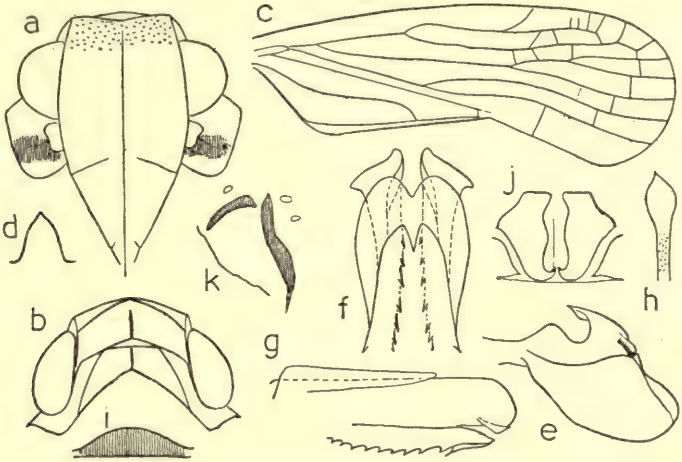

FIG. 36. *Hemiplectoderes trabeculatus* gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, tegmen; *d*, medioventral process of pygofer; *e*, genital style, lateral view; *f*, aedeagus, ventral view; *g*, same, lateral view; *h*, apex of one of phallic appendages; *i*, subvaginal plate; *j*, ventral lobes of first valvulae of ovipositor; *k*, sclerites of bursa copulatrix.

Ventral lobes of third valvulae of ovipositor subtriangular, distally truncate, sinuate on mesad border, subvaginal plate transversely elongate, lenticular. Bursa copulatrix armed with two sclerites, one elongate-cuneiform, the other, twice as long, sinuate-lanceolate.

Described from one male and one female taken in St. John's Valley, Northern Range, Trinidad, B.W.I., by Dr. J. G. Myers (10 February 1929 and 3 December 1928 respectively), Brit. Mus. 1929–170, on undergrowth of hill forest.

This genus is distinguished by the proportions of the head and pronotum.

SYMPLEGADELLA gen. n.

Head with eyes distinctly narrower than pronotum. Vertex across base broader than long in middle line (3:1), produced before eyes for two-fifths of their length, medially carinate except at apex, disk slightly declivous, anterior margin angulately produced forming an angle of 133° at apex, lateral margins straight, diverging basad, posterior margin shallowly subangulately concave; frons moderately convex in profile, longer than broad (1·2:1), 1·6 times as wide at widest part as at base, lateral margins carinate, convex, gradually diverging to below level of antennae thence incurved to suture, median carina present throughout, disk not hollowed out longitudinally, clypeus moderately short, laterally and medially carinate; antennae subglobose, not sunk in a depression, eyes not covering pronotum. Pronotum moderately short, in middle line equal to or slightly exceeding vertex in same line, tricarinate, lateral carinae of disk straight, diverging basad to margin, each 1·3 times as long as median carina, anterior margin angulately convex, posterior margin angularly excavate, pronotum laterad of disk moderately broad, scarcely inclined anteroventrad; mesonotum longer than vertex and pronotum combined (3·6:1), tricarinate; post-tibiae with a single spine basad of middle. Tegmina with Sc+R forking at level of Cu1 fork and union of claval veins. Clavus terminating distad of middle of tegmen.

Ovipositor with ventral lobe of first valvulae subtriangular, coarsely setose. Subvaginal plate transversely elongate, lenticular. Bursa copulatrix ornamented with thick-walled rings of equal size, each beset with about eight pustules.

Type species, *Symplegadella irrorata* sp. n.

Symplegadella irrorata sp. n.

(FIG. 37)

Female: length, 6·5 mm.; tegmen, 7·5 mm.

Head testaceous; pronotum testaceous with three obsolete depressions laterad fuscous; mesonotum fuscous-piceous with four paler spots on disk, tegulae testaceous; femora fuscous, tibiae and tarsi testaceous. Tegmina with pale ground colour, but so heavily barred fuscous-piceous between the veins, herring-bone pattern, as to appear fuscous; veins alternately pallid and fuscous-piceous. Wings smoky.

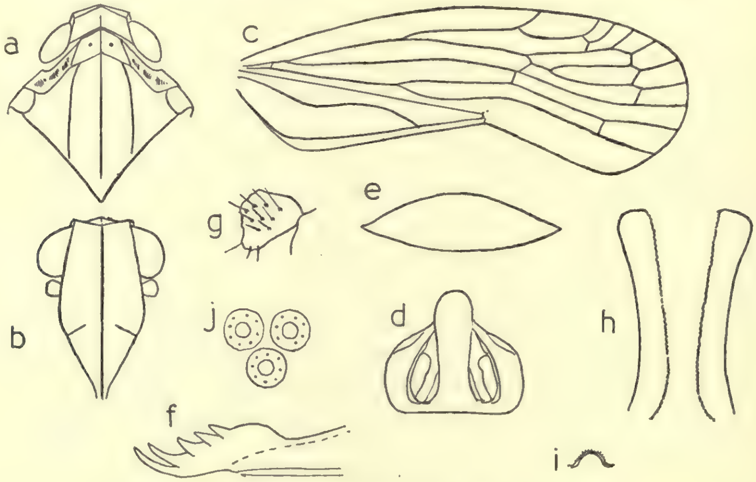

FIG. 37. *Symplegadella irrorata* gen. et sp. n.

a, vertex, pronotum, and mesonotum; *b*, frons and clypeus; *c*, tegmen; *d*, anal segment of female; *e*, subvaginal plate; *f*, apex of first valvula of ovipositor; *g*, ventral lobe of first valvula; *h*, pair of shagreen folds in wall of bursa copulatrix; *i*, cross-sectional view of one of folds (semi-diagrammatic); *j*, three rings from surface ornamentation of bursa copulatrix.

Anal segment of female short. Ovipositor with ventral lobe of first valvulae small, beset with about a dozen setae; first valvulae five-toothed, the teeth increasing in size distally. Bursa copulatrix with a pair of elongate, shagreened, rod-like structures formed by sclerotization of elongate grooves in the wall.

Described from one female taken at Sabo, Vera Paz (Champion). Type in British Museum (Natural History).

This genus appears to be close to *Phypia*, but differs in the proportions of the head and pronotum.

PHRYGIA Stål

1856. *Phrygia* Stål, *Öfvers. Vetensk. Akad. Förh. Stockh.* **13**:163. Haplotype, *Phrygia fuscata* Stål.

Head with eyes distinctly narrower than pronotum. Vertex across base broader than apparent length in middle line (1·5:1), not appreciably produced before eyes, medially carinate throughout, disk slightly declivous, anteriorly rounding into frons, not separated from it by a carina, lateral carinae straight, converging basad, posterior margin transverse; frons moderately convex in profile, longer than broad (1·1:1), 1·2 times as wide at widest part as at base, lateral margins carinate, convex, gradually diverging to below level of antennae thence incurved to suture, median carina present throughout, disk shallowly hollowed-out longitudinally on each side of middle; clypeus large, carinate medially and laterally; rostrum short, apical segment small; antennae subovate, not sunk in a depression, ocelli not contiguous with eyes, latter only slightly excavate beneath. Pronotum rather long, in middle line about a quarter length of vertex in same line, median carina distinct, lateral carinae of disk obsolete, diverging to hind margin, each about twice as long as median carina, anterior margin truncate, posterior margin angularly excavate, pronotum laterad of disk distinctly wide, not inclined anteroventrad, carinate at margins, between eyes and tegulae, ventro-lateral fields large, lower margin rounded; mesonotum tricarinate; post-tibiae with a single spine basad of middle.

Tegmina 2·6 times as long as broad, Sc+R fork and Cu1 fork at same level near middle, clavus terminating distad of middle, R simple, M four-branched, Cu1a simple, Cu1b simple.

Phrygia fuscata Stål

(Fig. 38)

1856. *Phrygia fuscata* Stål, *Öfvers. Vetensk. Akad. Förh. Stockh.* **13**:164.

The figures, kindly prepared by Dr. René Malaise, are of Stål's holotype.

PLECTORINGA gen. n.

1904. *Plectoderes* (*pars*) Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**:108.

Head with eyes rather narrower than pronotum. Vertex wider across base between basal angles than long in middle line (2·3:1), declivous, produced before eyes for about one-fifth of their length, medially carinate in basal half, anterior margin

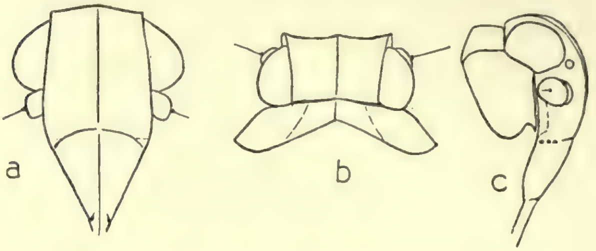

FIG. 38. *Phrygia fuscata* Stål.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile.

carinate, forming an angle of 110° at apex, lateral margins straight, diverging basad, posterior margin excavate in an angle of 115°; frons convex transversely and in profile, longer than broad (about 1·5:1), widest part about one-sixth broader than width at base, median and lateral carinae distinct; antennae subovate, slightly sunk in a depression, ocelli not quite contiguous with eyes, eyes excavate ventrally. Pronotum in middle line two-thirds length of vertex in same line, not hidden below eyes laterad of disk; anterior margin of disk transverse, posterior margin shallowly angularly excavate, lateral carinae of disk slightly sinuate, each 2·3 times as long as median carina; areas laterad of disk not steeply inclined anteroventrally, comparatively long behind eyes, devoid of supernumerary carinae; mesonotum longer than vertex and pronotum combined, tricarinate; post-tibiae with a single spine basad of middle.

Tegmina with Sc+R fork at same level as Cu1 fork, Sc with one cell at stigma; ten areoles along apical margin. Clavus terminating at middle of tegmen.

Medioventral process of pygofer approximately semicircularly rounded, obsoletely excavate at apex.

Type species, *Plectoderes excelsus* Fowler.

Plectoringa excelsa (Fowler)

(FIG. 39)

1904. *Plectoderes excelsus* Fowler, loc. cit.: 109, pl. 11, fig. 21, *a*.

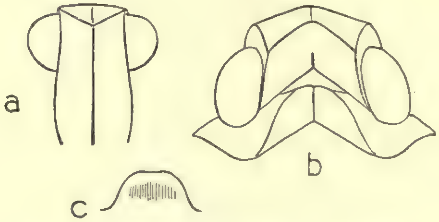

FIG. 39. *Plectoringa excelsa* (Fowler).
a, frons, anterodorsal view; *b*, vertex and pronotum; *c*, medioventral process of pygofer.

Notwithstanding Fowler's note the paratype series includes a male, which is figured.

RHINOCOLURA gen. n.

1904. *Plectoderes* (pars) Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**: 108.

Head with eyes a little narrower than pronotum. Vertex declivous, wider across base than long in middle line (2·8 : 1), slightly produced before eyes, medially carinate, anterior margin carinate forming an angle of 150° at apex, lateral margins straight, slightly diverging basad, posterior margin very shallowly excavate; frons convex in profile, medially carinate throughout, longer in middle line than broad (1·4 : 1), widest part about 1·3 times width at base, lateral margins slightly convex or almost straight to below level of antennae thence incurved to suture; antennae not sunk in a depression, ocelli remote from eyes, eyes not excavate below. Pronotum in middle line slightly more than half length of vertex in same line, distinctly overlapped by eyes laterad of disk, anterior margin of disk transverse, posterior margin angulately excavate, lateral carinae of disk straight or nearly so, each fully three times as long as median carina, areas laterad of disk steeply inclined anteroventrally, devoid of supernumerary carinae and areolets: mesonotum about twice as long as vertex and pronotum together, tricarinate, carinae parallel; post-tibiae unispinose.

Tegmina relatively long; Sc+R fork about level with Cu1 fork.

Type species, *Plectoderes championi* Fowler.

This genus is distinguished by the shape of the vertex, frons, and pronotum, by the proportions of the body and its size. It differs from *Amblycratus* Uhler and *Hemiplectoderes* in the shape of the frons, and from *Plectoringa* in the shape of the vertex.

Rhinocolura championi (Fowler)

(FIG. 40)

1904. *Plectoderes championi* Fowler, loc. cit.: 108, pl. 11, fig. 19, *a*.

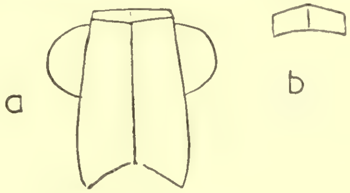

FIG. 40. *Rhinocolura championi* (Fowler).
a, frons, anterodorsal view; *b*, vertex.

The type species is comparatively large for a member of this tribe, being 9 mm. from vertex to apex of folded tegmen.

CAFFROPYRRHYLLIS gen. n.

Head with eyes about as wide as pronotum. Vertex broader than long (3·3 : 1) anterior margin carinate, broadly arcuate, passing insensibly into lateral margins, posterior margin broadly excavate, median carina percurrent, somewhat obscure; base of frons visible from above; frons longer than broad (1·3:1), very little wider at widest part than at base, median carina percurrent, lateral carinae slightly foliate distally; clypeus rather short, carinate medially and laterally; rostrum with subapical segment as long as apical; antennae subglobose, exposed dorsally, not sunk in a depression, ocelli not touching eyes, eyes not covering pronotum laterally. Pronotum moderately short, medially carinate, not much inclined anteroventrally laterad of disk, anterior margin broadly convex, posterior margin shallowly concave, ventral margins of lateral lobes rounded, lateral carinae of disk not passing to hind margin, no carina between eye and tegula; mesonotum longer than vertex and pronotum combined, distinctly tricarinate; pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina narrow, Sc+R fork level with Cu1 fork, Cu1b not deeply convex distad of fork; clavus terminating distad of middle.

Posterior margin of seventh sternite of female transverse, ventral lobes of first valvulae of ovipositor relatively broad, obliquely truncate distally; third valvulae broadly subovate, a membranous lobe in ventral half of apical margin. Bursa copulatrix furnished with a sclerotized plate.

Type species, *Caffropyrrhyllis bicuspidata* sp. n.

Caffropyrrhyllis bicuspidata sp. n.

(FIG. 41)

Male: length, 3·1 mm.; tegmen, 3·9 mm. Female: length, 3·9 mm.; tegmen, 4·8 mm.

Testaceous; a suffusion below antennae and a faint suffusion on each side of each mesonotal carina brown to fuscous; ventral portion of lateral pronotal lobes fuscopiceous; a pallid vitta from antenna to lower half of tegula, including latter; legs pallid ochraceous; abdomen fuscous.

Tegmina translucent, suffused yellowish-brown; cell Sc, stigma, apical cells of Sc, R, and M1 and membrane just distad of apex of clavus somewhat darker; veins concolorous, pale in membrane. Wings slightly smoky, veins fuscous.

Anal segment of female short, lateral margins converging distally, apical margin notched. Ventral lobes of first valvulae straight on inner margin, external margin subparallel to latter, apical margin oblique. Bursa copulatrix armed with a sclerotized plate bearing a long finger-like spine directed anteriorly and a short blunt subspinose eminence at its base.

Described from two males and two females: 1♂ Mossel Bay, Cape Province, South Africa, 1921, Brit. Mus. 1921–450 (October) and 1921–353 (August); 1♂, 1♀ Mossel Bay, Brit. Mus. 1921–353, 1♀ Katberg, 4,000 ft., December 1932 (Brit. Mus. 1933–695), collected by R. E. Turner.

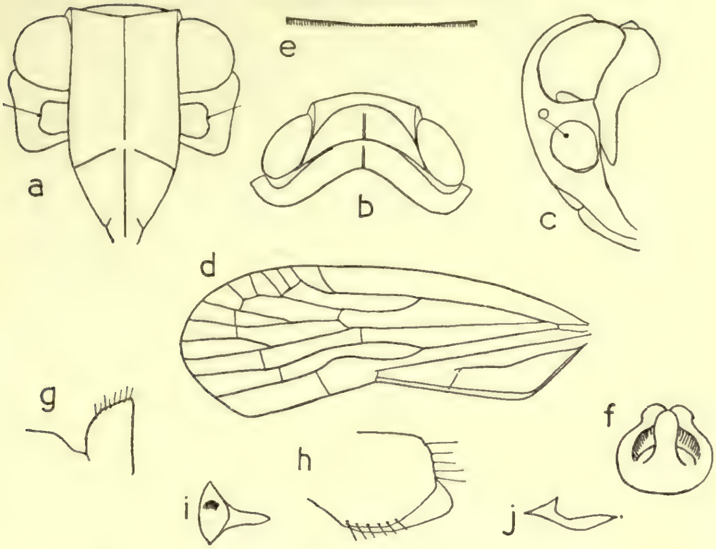

FIG. 41. *Caffropyrrhyllis bicuspidata* gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, posterior margin of seventh abdominal sternite of female; *f*, anal segment of female; *g*, ventral lobe of first valvula of ovipositor; *h*, third valvula of ovipositor, lateral view; *i*, *j*, postero-lateral and lateral views of sclerite in bursa copulatrix.

TROPIPHLEPSIA Muir

1924. *Tropiphlepsia* Muir, *Mem. Qd. Mus.* **8**:32. Orthotype, *Tropiphlepsia badia* Muir, loc. cit.:32.

Head with eyes as wide as pronotum. Vertex broader across base than long in middle (8:1), anterior margin carinate, transverse at apex, lateral margins carinate, longer than vertex in middle line, slightly convex, diverging basad, posterior margin roundly excavate, median carina present; frons broad, slightly wider at base than apex, lateral margins slightly convex, not foliate, median carina weakly present; clypeus short, medially and laterally carinate; antennae subglobose, scarcely sunk in a depression, eyes not completely overlapping pronotum though nearly so. Pronotum very short, disk broad, areas laterad of disk strongly inclined antero-ventrally, lateral carinae of disk each twice as long as median carina; mesonotum slightly wider than long, about five times as long as vertex and pronotum combined, distinctly tricarinate, lateral carinae convex. Legs short, pro- and meso-femora slightly flattened.

Tegmina with a small costal area at base, Sc+R fork almost level with Cu1 fork, M united basally in a stalk with Sc+R, M fork level with node, M1+2 forked basad of apical transverse veins, M3+4 forked at their level; Cu1 curved mesad to meet M3+4; clavus terminating about middle; a foliate carina on M, Cu1a+b, Cu1b, and in two places on second claval vein.

Anal segment of female small, seventh sternite with posterior margin deeply angularly excavate.

Tropiphlepsia badia Muir

(FIG. 42)

1924. *Tropiphlepsia badia* Muir, loc. cit.: 32.

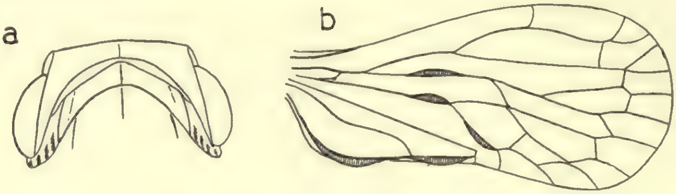

FIG. 42. *Tropiphlepsia badia* Muir.
a, vertex and pronotum; *b*, tegmen.

The drawings are from a specimen in the British Museum.

ARISTYLLIS Kirkaldy

1906. *Aristyllis* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1** (9): 418. Orthotype, *Aristyllis aristyllis* Kirkaldy, loc. cit.: 419.

1926. *Winawa* Haupt, *Philipp. J. Sci.* **29**: 442. Haplotype, *Winawa bicolor* Haupt, loc. cit.: 443, pl. 1, figs. 7, 8.

Head with eyes not as wide as pronotum. Vertex declivous, anterior margin carinate, forming a distinct angle at apex, lateral margins straight, diverging basad, posterior margin subangularly excavate, median carina weakly percurrent; frons longer than broad (1·2 : 1), lateral margins straight or very slightly sinuate, diverging to below level of antennae, thence incurved, slightly foliate laterad distally, disk convex in basal half, strongly impressed in middle portion of distal half, clypeus short with lateral margins straight, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli

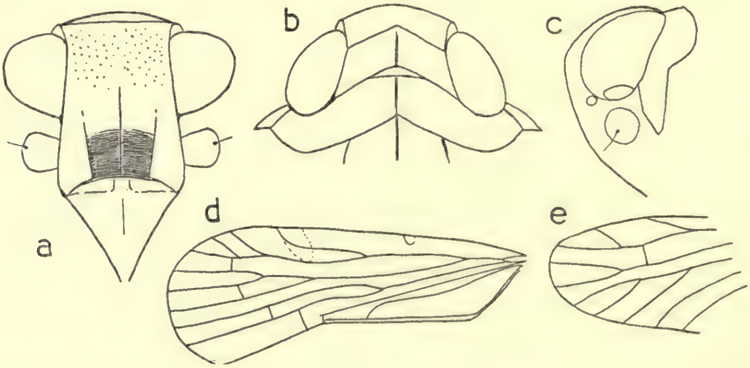

FIG. 43. *Aristyllis omphale* Kirkaldy.
a, frons and clypeus; *b*, vertex and pronotum; *c*, basal portion of head in profile; *d*, tegmen; *e*, apex of wing.

touching eyes, eyes excavate beneath, not covering pronotum laterad of disk. Pronotum moderately short, ventral margins of lateral lobes slightly obliquely transverse; mesonotum longer than vertex and pronotum together, distinctly tricarinate; pro-tibiae equal to femora, post-tibiae with a single spine basad of middle.

Tegmina with Sc+R fork distad of Cu1 fork, Cu1b not deeply convex distad of fork; clavus terminating distad of middle.

The genus is Australasian and at present includes only *A. aristyllis* Kirkaldy, *A. omphale* Kirkaldy (Fig. 43), *A. adippe* Kirkaldy, and *A. bicolor* Haupt.

PLECTODEROIDES Matsumura

1914. *Plectoderoides* Matsumura, *Ann. hist. nat. Mus. hung.* **12**: 281. Orthotype, *Plectoderoides maculatus* Matsumura, loc. cit.: 282.

Head with eyes not as wide as pronotum. Vertex broader between basal angles than long in middle (2·5:1), anterior margin rounded-convex, carinate, lateral margins almost straight, posterior margin subangulately excavate, median carina present; frons longer than broad (1·2:1), lateral margins straight, diverging to below level of antennae thence strongly incurved, median carina weakly present, most distinct near base; clypeus rather short, medially and laterally carinate; antennae subovate, not sunk in a depression, eyes not covering pronotum. Pronotum moderately short, medially carinate, lateral carinae of disk convex, reaching hind margin, as long as median carina; mesonotum longer than vertex and pronotum combined, tricarinate; post-tibiae with a single spine basad of middle.

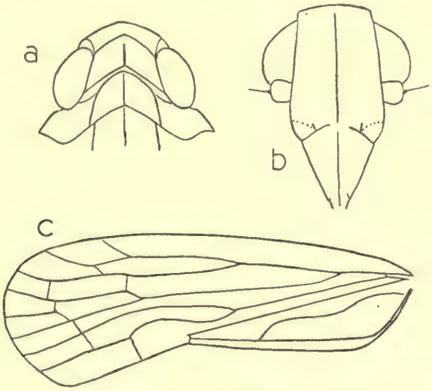

FIG. 44. *Plectoderoides maculatus* Matsumura.
a, vertex and pronotum; *b*, frons and clypeus; *c*, tegmen.

Tegmina with Sc+R fork level with Cu1 fork, clavus terminating distad of middle, Sc with two branches at apex, Cu1b rather prominently convex distad of fork.

The genus is Oriental and includes *P. maculatus* Matsumura (Fig. 44) and *P. formosanus* Matsumura. The figures are after Matsumura.

BENELLA Kirkaldy

1906. *Benella* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1** (9):420. Haplotype, *Benella aliena* Kirkaldy, loc. cit.:420.

Head with eyes not as wide as pronotum. Vertex declivous, anterior margin carinate, shallowly convex, lateral margins straight, diverging basad, posterior margin angularly concave, median carina distinct; frons longer than broad, lateral margins slightly convex, diverging to below level of antennae thence incurved, disk slightly convex, not at all impressed distally, clypeus rather short, medially and laterally carinate; antennae subglobose, not sunk in a depression; eyes not covering pronotum laterad of disk. Pronotum moderately short, ventral margins of lateral lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate; post-tibiae with a single spine basad of middle.

Tegmina smooth, not granulate, with Sc+R fork about level with Cu1 fork, Cu1b not markedly convex distad of fork; veins thin and prominent; clavus terminating distad of middle.

The genus is Australian and includes only the type species. The presence of a pair of pallid bands on the frons may prove to be universal in the genus, but is not limited to *Benella*.

KOSALYA Distant

1906. *Kosalya* Distant, *Fauna Brit. Ind. Rhynch.* **3**:292. Haplotype, *Kosalya flavostrigata* Distant.

Head with eyes markedly narrower than pronotum. Vertex slightly declivous, broader across base than long in middle line (3:1), produced before eyes for about a third of their length, medially carinate, carina distinct in basal half, obsolete distally, anterior margin carinate, rounded subangulately through 130°, lateral margins straight, diverging basad, posterior margin excavate in an angle of 120°; frons slightly convex in profile, longer in middle line than broad (1·2:1), widest part broader than width at base (1·5:1), median carina percurrent, lateral margins carinate, convex distally, foliate laterad; clypeus moderately long, medially and laterally carinate, frons and clypeus longitudinally impressed on each side of middle line, rostrum with subapical segment shorter than apical; antennae ovate, not sunk in a depression; ocelli not touching eyes, eyes not covering pronotum. Pronotum moderately short, anterior margin of disk truncate, posterior margin angularly excavate, median carina present, lateral carinae of disk straight or slightly concave, each three times as long as median carina, pronotum laterad of disk inclined anteroventrally, ventral margins of lateral lobes angulate and oblique; mesonotum about twice as long as vertex and pronotum together, distinctly tricarinate; pro-tibiae shorter than profemora and trochanters, post-tibiae with a spine basad of middle and one distad of middle.

Tegmina with Sc+R fork slightly distad of Cu1 fork, M forking just basad of node, about seven apical areoles in Sc and R distad of stigma, M1+2 forked at level of stigma, clavus terminating at middle.

The genus is so far represented only by the type species.

Kosalya flavostrigata Distant

(Fig. 45)

1906. *Kosalya flavostrigata* Distant, loc. cit.: 293, fig. 140.

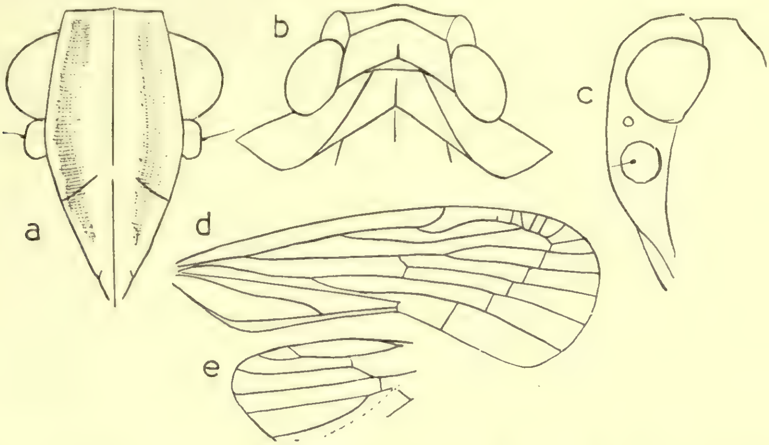

Fig. 45. *Kosalya flavostrigata*, Distant.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of tegmen

The figures are of the holotype. It is uncertain whether the bispinose condition of the post-tibiae is normal.

KAWANDA gen. n.

Head with eyes markedly narrower than pronotum. Vertex slightly declivous, broader across base than long in middle line (3:1), produced before eyes for slightly more than a fifth of their length, medially carinate except at apex, anterior margin carinate forming an angle of 150° at apex, lateral margins straight, diverging basad, posterior margin excavate in an angle of 143°; frons moderately convex in profile, longer in middle line than broad (1·3:1), widest part wider than base (1·3:1), median carina percurrent, lateral margins carinate, convex, slightly foliate laterad distally; clypeus fully two-thirds length of frons in middle line, medially and laterally carinate; antennae subovate, not sunk in a depression; ocelli not touching eyes, eyes slightly excavate beneath, not extensively overlapping pronotum. Pronotum moderately short, anterior margin of disk subtruncate, posterior margin deeply concave, median carina present, lateral carinae of disk concave, not attaining posterior margin, each 3·4 times length of median carina, pronotum laterad of disk distinctly inclined anteroventrally, ventral margins of lateral lobes oblique; mesonotum about twice as long as vertex and pronotum combined, distinctly tricarinate; post-tibiae with a single spine basad of middle.

Tegmina elongate, Sc+R fork at same level as Cu1 fork, both basad of union of claval veins, M forked almost level with apex of clavus, nine apical areoles distad of stigma; clavus terminating at middle. Wings with R and M each two-branched, Cu1 three-branched.

Anal segment of female short. Posterior margin of seventh sternite very slightly convex, feebly produced on each side of middle, with a shallow concavity medially. Ovipositor with first valvulae quadrispinose, third valvulae subquadrate, slightly expanded distally, membranous portion of apical margin produced at its upper end.

Type species, *Kawanda luteovittata* sp. n.

Kawanda luteovittata sp. n.

(Fig. 46)

Female: length, 4·2 mm.; tegmen, 6·3 mm.

Testaceous-fuscous; a round spot on gena below antennae near suture piceous, antennae and mesonotum ferruginous. Tegmina dull brown, a pale yellow band along whole of costal margin, extending across costal and subcostal cells.

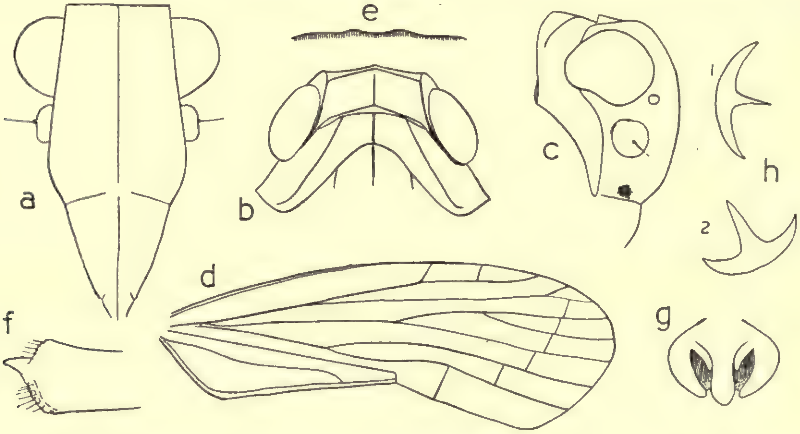

Fig. 46. *Kawanda luteovittata*, gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, frons in profile; *d*, tegmen; *e*, posterior margin of pregenital sternite; *f*, third valvula of ovipositor, lateral view; *g*, anal segment of female; *h*, (1) sclerite in vagina, (2) sclerite at entrance to bursa copulatrix; these sclerites are situated in relation to each other as shown.

First valvulae of ovipositor quadridentate with basal tooth short and the remainder relatively long. Bursa copulatrix furnished near entrance with a crescentic sclerite with a stout spine at middle nearly as long as each limb of crescent, a sclerite of similar shape in vagina.

Described from one female collected at Kawanda, Uganda, by T. H. C. Taylor (10 June 1941). Type in British Museum. *Kawanda* is distinguished by the shape of the head and by tegminal venation.

LANUVIA Stål

1866. *Lanuvia* Stål, *Hemipt. Africana*, **4**: 182.

Head with eyes slightly narrower than pronotum. Vertex not declivous or scarcely so, broader across base than long in middle line (1·6:1), produced before eyes for about a third of their length, median carina absent, disk depressed, anterior margin carinate forming an angle of 135° at apex, lateral margins subparallel, straight, posterior margin truncate; frons moderately convex in profile, longer in middle line than broad (1·1:1), widest part wider than base (1·3:1), basal margin slightly excavate, median carina percurrent, lateral margins carinate, straight to below level of antennae, thence incurved to suture, strongly foliate laterally, disk of frons and clypeus depressed on each side between middle line and lateral margin; clypeus two-thirds length of frons, medially and laterally carinate; rostrum not attaining post-trochanters, antennae rather small, subovate, not sunk in a depression; ocelli not quite touching eyes, eyes not excavate beneath, moderately overlapping pronotum. Pronotum short, anterior margin of disk truncate, posterior margin excavate in an angle of 125°, median carina present, lateral carinae of disk concave, attaining hind margin or nearly so, each about three times as long as median carina, pronotum laterad of disk distinctly inclined anteroventrally, ventral margin of lateral lobes angulate and oblique; mesonotum about twice as long as vertex and pronotum combined, distinctly tricarinate; legs rather short, pro-tibiae subequal to pro-femora and pro-tibiae combined; post-tibiae with a single spine basad of middle.

Tegmina elongate, costal margin markedly convex at base, Sc+R fork slightly basad of Cu1 fork, level with or distad of union of claval veins; M forked level with stigma, nine apical areoles distad of stigma; clavus terminating distad of middle. Wings with R and M each two-branched, Cu1 three-branched.

Posterior margin of seventh abdominal sternite of female sinuate, transverse. Ovipositor with third valvulae subquadrate, apical margin convex-truncate, slightly oblique. Anal segment of female short, apical margin excavate. Bursa copulatrix furnished with a crescentic sclerite with a spine at middle.

Type species, *Lanuvia luteovittata* sp. n.

Lanuvia luteovittata sp. n.

(Fig. 47)

Female: length, 5·0 mm.; tegmen, 6·8 mm.

Fuscous-piceous; basal half of frons fuscous, lateral carinae of vertex and of pronotal and mesonotal disks, a stripe from ocelli across mesopleurites, lateral marginal carinae of pronotum, and dorsal portion of tegulae, chrome yellow; base of abdomen dorsally testaceous or pale brown.

Tegmina fuscous-piceous; costal margin, an oblique stripe from base of costa to middle of M in corium, an oblique stripe from Sc+R fork to M fork, apical portion of Cu2 in clavus and pCu chrome yellow; veins otherwise piceous. Wings fuscous, veins darker.

Seventh abdominal sternite of female with posterior margin sinuate, shallowly convex in middle portion. Ovipositor with third valvulae subquadrate, apical margin oblique. Bursa copulatrix furnished at entrance with a crescentic sclerite bearing a long stout spine at middle.

Described from two females labelled 'Cameroons 1903–355'. Type in Brit. Mus. (N.H.).

The genus *Lanuvia* was characterized in tome iv of *Hemiptera Africana* without mention of species. No species has subsequently been placed in the genus. According to Opinion 46 of the International Commission on Zoological Nomenclature genera described without mention of species are to be regarded as including all the species in the world which agree with the generic description. The above species agrees very well with the detailed description of the genus given by Stål; moreover, this and the following species are both known only from Africa. On these grounds the writer has selected *luteovittata* as the type species.

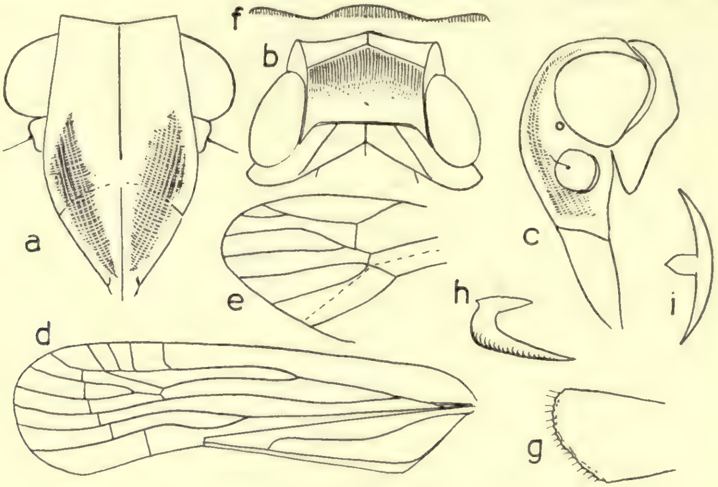

FIG. 47. *Lanuvia luteovittata*, sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of wing; *f*, posterior margin of pregenital sternite; *g*, third valvula of ovipositor, lateral view; *h*, *i*, lateral and posterior views of spinose sclerite at entrance to bursa copulatrix.

Lanuvia octoguttata sp. n.

(FIG. 48)

Female: length, 5·1 mm.; tegmen, 6·3 mm.

Dark testaceous; a round spot on each lateral field of pronotum piceous; disk and lateral fields of mesonotum, median carina, base and apex of pro- and meso-tibiae, apex of post-tibiae and abdomen, fuscous.

Tegmina fuscous-piceous, costal area and costal cell testaceous-ferruginous, veins ferruginous; a slightly oblique elongate spot in cell Sc+R at basal third, another at apex of same cell, overlapping cell M slightly, a broad band overlying first claval vein, chrome yellow.

Posterior margin of seventh sternite transverse, middle portion shallowly excavate. Ovipositor with third valvulae subquadrate, apical margin truncate-convex, not oblique. Bursa copulatrix furnished with a crescentic sclerite with a stout spine at middle.

Described from two females, one taken at 4,800 ft., Mpanga forest, Toro, 13–23 November 1911, and Daro forest, Toro, 4,000–4,500 ft., 25–29 October 1911, Uganda, by S. A. Neave, Brit. Mus. 1912–193. The markings distinguish the two species, while the median spine on the crescentic sclerite is shorter in *octoguttata* than in *luteovittata*.

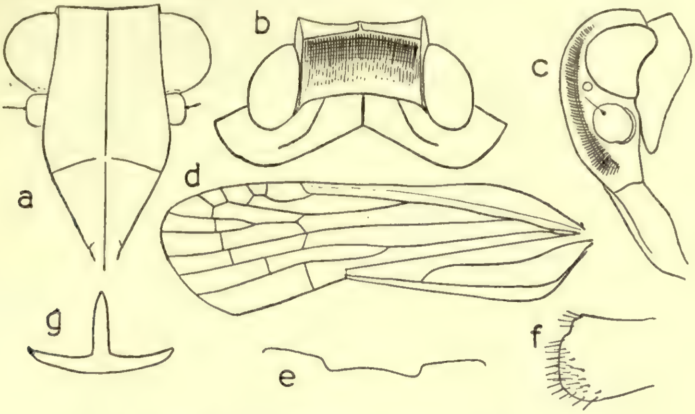

FIG. 48. *Lanuvia octoguttata*, sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, posterior margin of pregenital sternite of female; *f*, third valvula of ovipositor, lateral view; *g*, spinose sclerite at entrance to bursa copulatrix.

CATONOIDES Metcalf

1938. *Catonoides* Metcalf, *Bull. Mus. comp. Zool. Harv.* **82**:376. Orthotype, *C. fusca* Metcalf.

Head with eyes slightly narrower than pronotum. Vertex not declivous or scarcely so, broader across base than long in middle line (about 2:1), produced before eyes for scarcely a fifth of their length, median carina distinct throughout, disk slightly depressed, anterior margin carinate, convex through an angle of approximately 110°, lateral margins carinate, short, diverging basad, posterior margin broadly excavate; frons moderately convex in profile, longer in middle line than broad (about 1·3:1), widest part wider than base (1·5:1), basal margin excavate, median carina percurrent, lateral margins carinate, straight or slightly concave to below level of antennae thence incurved to suture, slightly foliate laterad distally, disk of frons not depressed, clypeus about as long as frons in middle line, medially and laterally carinate, rostrum just attaining posterior trochanters, antennae subovate, not sunk in a depression, ocelli not touching eyes, eyes almost completely overlapping pronotum. Pronotum short, anterior margin of disk truncate, posterior margin broadly concave, median carina present, lateral carinae of disk concave, each about 1·6 times as long as median carina, attaining posterior margin, pronotum laterad of disk distinctly inclined anteroventrally, ventral margin of lateral lobes angulate and oblique; mesonotum more than twice as long as vertex and pronotum combined, distinctly tricarinate, carinae parallel; post-tibiae with a single spine basad of middle.

Tegmina moderately long (length–breadth 3·3:1), anterior margin slightly convex, commissural margin forming a re-entrant angle of 158° at apex of clavus, Sc+R fork about level with Cu1 fork or slightly basad, both about level with union of claval veins, M forked level with node or nearly so, nine apical areoles distad of stigma; clavus terminating at middle.

Catonoides fusca Metcalf

(FIG. 49)

1938. *Catonoides fusca* Metcalf, loc. cit.: 377.

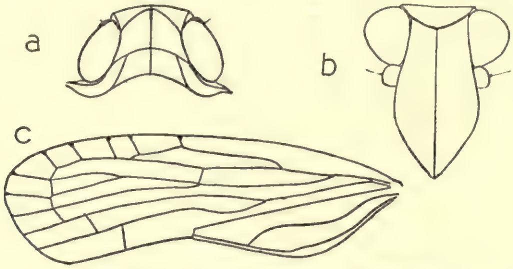

FIG. 49. *Catonoides fusca* Metcalf.
a, vertex and pronotum; *b*, frons and clypeus, anterodorsal view; *c*, tegmen.

The writer is indebted to Dr. J. C. Bequaert of the Museum of Comparative Zoology for the accompanying figures of the type.

PARACATONIA gen. n.

Head with eyes slightly narrower than pronotum, slightly declivous, broader across base than long in middle line (1·8:1), produced before eyes for slightly more than a third of their length, disk markedly depressed, medially carinate throughout, anterior margin carinate, forming an angle of 150° at apex, lateral margins straight, foliately carinate, diverging basad, posterior margin shallowly excavate; frons moderately convex in profile, longer in middle line than broad (1·2:1), widest part wider than base (1·6:1), median carina percurrent, lateral margins carinate, convex, slightly foliate obliquely; clypeus three-quarters as long as frons, medially and laterally carinate; rostrum reaching post-trochanters, apical segment longer than subapical, antennae subovate, not sunk in a depression; ocelli very narrowly separated from eyes, eyes unpigmented above antennae, considerably overlapping pronotum. Pronotum short, anterior margin of disk truncate, posterior margin concave through about 100°, median carina present, lateral carinae of disk straight or slightly concave, attaining hind margin, each more than four times as long as median carina, pronotum laterad of disk inclined anteroventrally, with indications of areolets near posterior margin, two carinae on each side between eye and tegula, ventral margins of lateral lobes transverse or very slightly oblique, mesonotum about twice as long as vertex and pronotum combined, tricarinate, the carinae parallel; pro-tibiae as long as pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina slightly more than three times as long as broad, Sc+R forking two-fifths from base, level with Cu1 fork and union of claval veins, M forked at nodal line, eight apical areoles distad of stigma, those of M two-thirds as long as the corresponding subapical cells; clavus terminating distad of middle. Wings with R simple, M two-branched, Cu1 three-branched.

Anal segment of male very short. Pygofer with medioventral process longer than broad, bifid. Anal segment of female short.

Posterior margin of seventh sternite of female transverse, shallowly concave at middle. Ovipositor with first valvulae armed dorsally with four small teeth and two apical spines, third valvulae subrhomboidal.

Type species, *Paracatonia securifalcata* sp. n.

Paracatonia securifalcata sp. n.

(Fig. 50)

Male: length, 2·4 mm.; tegmen, 2·8 mm. Female: length, 2·6 mm.; tegmen, 3·0 mm.

Fuscous; frons with eight spots inside each lateral margin, a few small spots on each side of middle line and a large pair in distal quarter, pallid, a spot at each side basally on clypeus, vertex, and pronotum, except in depression, mesonotum with carinae, three pairs of spots and basally a pair of curved lines on disk, and two large spots on each lateral field, pallid. Tegmina mostly pale, veins pale, three small dark spots in costal area, a dark spot between Cu1a and Cu1b at level of apex of clavus, a row of dark spots between posterior claval vein and commissural margin fuscous; remainder of corium sparsely marked pale fuscous, membrane smoky-brown except on veins and a pale arcuate band across apical areoles. Wings infuscate.

Anal segment of male short, anal foramen occupying most of dorsal surface, lateral margins in profile with a small distinct lobe near base. Genital styles in profile narrow basally, expanding distally into a rhomboidal lobe, eminence on dorsal margin distad of middle, followed proximally by a deep excavation, a short pointed process arising on inner face basally, directed mesally and posteriorly. Medioventral process of pygofer elongate, bifid, each limb directed laterally at apex.

Phallobase with a pair of lobes, in dorsal view narrowed and finger-like in apical quarter; ventrally a pair of spinose processes on each side, the basal processes arising one-quarter from base, directed laterally, the distal pair longer, arising two-thirds from base, curved outward and anteriorly. Aedeagal appendages strap-like, of equal length, abruptly narrowed in profile at about apical quarter, and bearing an oblique spine at the apex.

Anal segment of female short, deeply notched at middle of apical margin. Subvaginal plate with lateral sclerites rod-like, slightly converging dorsad, not meeting transverse sclerotization of ventral margin. Ventral lobes of first valvulae triangular, with inner margin straight, outer oblique, devoid of accessory lobes at base. First valvulae with four small teeth dorsally, the distad longest, and two larger curved apical teeth. Third valvulae in profile trapezoidal with apical margin produced into two lobes of unequal size, the dorsal larger. Bursa copulatrix with a large diverticulum, somewhat constricted near its mouth, ornamented with minute sclerotized rings over entire surface: at entrance a large, stout, crescentic sclerotized bar, pointed at one end with a stout tooth projecting at middle of inner margin. Distad of this sclerite a larger, approximately hatchet-shaped sclerite with the limb pointed at each end and a short tooth at one angle of the quadrate plate.

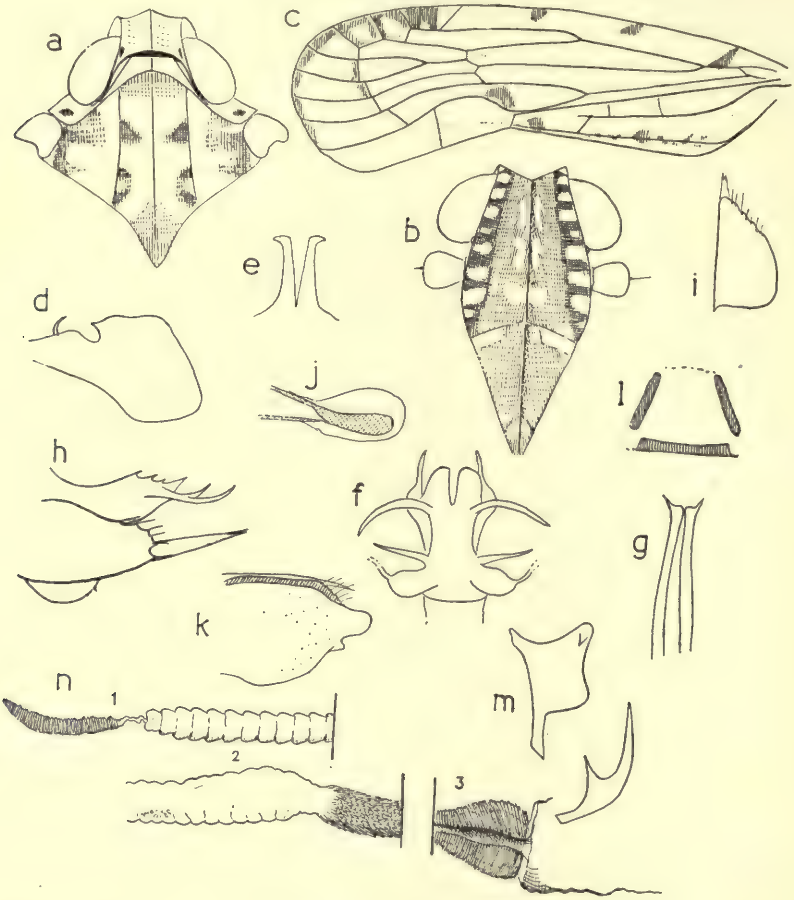

FIG. 50. *Paracatonia securifalcata*, gen. et sp. n.

a, vertex, pronotum and mesonotum; *b*, frons and clypeus; *c*, tegmen; *d*, left genital style; *e*, medioventral process of pygofer; *f*, aedeagus; *g*, apical portion of phallic appendages; *h*, first valvulae of ovipositor, lateral view; *i*, ventral lobe of first valvula; *j*, second valvula; *k*, third valvula; *l*, sclerites bordering subvaginal plate; *m*, sclerites at entrance to bursa copulatrix; *n*, (1), (2), (3) distal, mesal, and proximal portions of spermatheca.

Egg ovoid, approximately twice as long as broad, micropylar pole rather flattened, micropyle surrounded by a palisade of contiguous finger-like lobes.

Described from 16 males and 11 females taken by the writer at 1,000 ft. in mountain forest near Saltoun, Dominica, B.W.I. (5–11 June 1940). A single female taken at Dudmar, Grenada (20 October 1943) agrees well with the Dominican species and is regarded as conspecific.

AMBLYCRATUS Uhler

1895. *Amblycratus* Uhler, *Proc. Zool. soc. Lond.*:64. Haplotype, *Amblycratus pallidus* Uhler.
1895. *Cionoderus* Uhler, loc. cit.:66. Haplotype, *Cionoderus lineatus* Uhler.

Vertex broader across base than long in middle (about 2:1), lateral margins straight, slightly converging anteriorly, anterior margin produced in an obtuse angle, approximately parallel to posterior margin, posterior margin shallowly excavate; disk slightly depressed, weakly carinate medially; frons in profile slightly curved, medially carinate, carina percurrent on clypeus, lateral margins almost straight and slightly diverging to below level of antennae, thence shallowly incurved to suture; clypeus marginally carinate; rostrum of male attaining hind trochanters, with its basal segment in lateral view twice as long as broad at apex. Pronotum short, disk broad, anteriorly transverse, posteriorly broadly emarginate, median and lateral carinae of disk distinct, latter twice as long as former, lateral areas behind eyes smooth; mesonotum tricarinate, lateral carinae almost parallel, slightly converging distally. Hind tibiae with a single minute spine at basad third. Tegmina three times as long as broad, anterior margin almost straight, apical margin broadly rounded, commissural margin forming a re-entrant angle of 158° at apex of clavus: Sc+R+M stalk as long as basal cell, Sc+R forked one-third from base, Sc forked at level of node, its distal branch simple to apex, R with two branches at margin, M forked at nodal line, with three branches at margin, Cu1 forked at level of Sc+R fork, Cu1a and Cu1b simple to margin; six subapical and eight apical cells. Wings with Sc simple, R with two branches at margin, length of cell R1 less than length of its stalk distad of R–M cross vein, M two-branched, Cu1a branched basad of level of M fork, Cu1b simple.

Anal segment of male in dorsal view broadly ovate, bilaterally symmetrical, anal foramen situated in basal half. Pygofer with lateral margins slightly sinuate, medioventral lobe slightly wider across base than long, distally rounded. Genital styles in profile subfusiform with an eminence on dorsal margin, basad of middle, bearing two broad pointed lobes directed anteriorly; a curved spine arising on inner face of style near base.

Anal segment of female broader than long (about 1·3:1), anal foramen large, anal style spatulate. Subvaginal plate more than twice as broad as long, sclerotized and pigmented over whole of surface, minutely shagreen in marginal areas. Ventral lobes of first valvulae relatively elongate, broadly elevated in a dome along axial line, first valvulae with six teeth on dorsal margin, third valvulae subquadrate, almost as broad as long. Bursa copulatrix ornamented with a pattern of very delicate and thin-walled rings, a strongly sclerotized and pigmented three-spined process, crescentic in outline, in wall near junction with vagina.

Amblycratus pallidus Uhler

(FIG. 51)

1895. *Amblycratus pallidus* Uhler, loc. cit.:65.
1895. *Cionoderus lineatus* Uhler, loc. cit.:66.

Medioventral process of pygofer almost semicircular. Genital styles in lateral view subovate with a bicuspidate lobe dorsally at basal quarter and a curved spine on inner face near base. Aedeagus comprising dorsally a pair of submembranous sinuate lobes directed dorsally and posteriorly, and a pair of horizontal elongate-ovate laminae, laterally a pair of flattened lobes tapering gradually to a blunt apex, which is decurved, ventrally a keel bearing a straight spine directed ventro-posteriorly; appendages of phallus shagreened distally; the limbs suspending the aedeagus are pincer-like near the point of attachment.

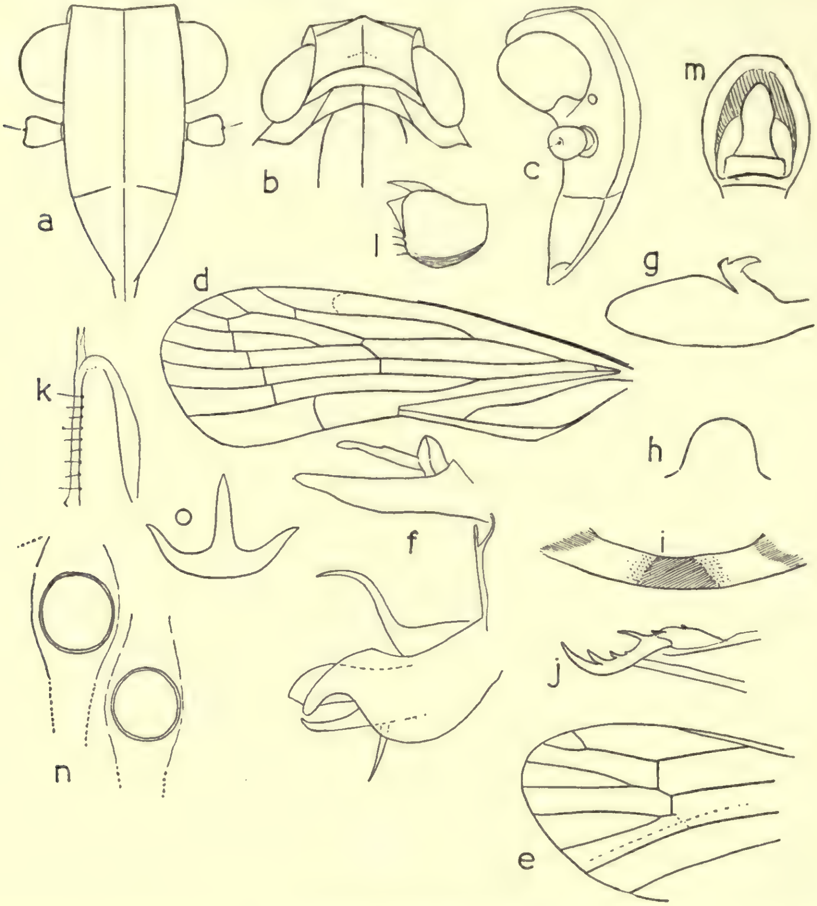

FIG. 51. *Amblycratus pallidus* Uhler.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of wing; *f*, anal segment and aedeagus, lateral view; *g*, right genital style; *h*, medioventral process of pygofer; *i*, subvaginal plate; *j*, first valvula of ovipositor, lateral view; *k*, ventral lobe of first valvula; *l*, third valvula, lateral view; *m*, anal segment of male; *n*, portion of surface of bursa copulatrix; *o*, sclerite at entrance to bursa copulatrix.

Subvaginal plate trapezoidal, slightly shagreened at sides.

In addition to the holotypes of *A. pallidus* Uhler and *Cionoderus lineatus* Uhler and paratypes in the U.S. National Museum, the writer has examined a series of 3 males and 3 females taken by him in forest on Morne Garu and on a ridge at the head of the Cumberland Valley, St. Vincent, B.W.I. (25 August, 8 September 1941).

AGANDECCA White

1879. *Agandecca* White, *Ent. mon. Mag.* **15**:217. Haplotype, *A. annectens* White.

Head with eyes a little narrower than pronotum. Vertex not declivous except along middle line, broader across base than long in middle (about 3:1), produced before eyes for about half their length, median carina distinct, disk inclined downward on each side of median carina, anterior margin carinate forming an angle of 130° at apex, lateral margins straight or convex, slightly diverging basad, posterior margin broadly excavate; frons shallowly convex in profile, longer in middle line than broad (1·5:1), widest part wider than base (1·2:1), basal margin truncate with a transverse narrowly triangular callus between middle line and lateral margins, median carina percurrent, lateral margins carinate, straight to below level of antennae, thence incurved to suture, not at all foliate, disk not depressed; clypeus rather more than half length of frons, medially and laterally carinate; antennae subovate, not sunk in a depression, ocelli remote from eyes, eyes not excavate beneath, moderately overlapping pronotum. Pronotum moderately short, laterally short, anterior margin of disk truncate, posterior margin concave, median carina present, lateral carinae of disk concave, not attaining hind margin, each two-and-a-half times as long as median carina, pronotum laterad of disk distinctly inclined anteroventrally, ventral margin of lateral lobes transverse or slightly oblique; mesonotum twice as long as vertex and pronotum combined, distinctly tricarinate, carinae more or less parallel; post-tibiae with a single spine basad of middle.

Tegmina moderately long, costal margin somewhat convex, Sc+R fork about level with Cu1 fork, both slightly distad of union of claval veins, M forked level with stigma, nine apical areoles distad of stigma; clavus terminating at middle of tegmen. Wings with R two-branched near apex, M two-branched, Cu1 three-branched.

Agandecca annectens White

(FIG. 52)

1879. *Agandecca annectens* White, loc. cit.:218.

The figures are of the holotype. The genus is known only from New Zealand and at present includes only this species.

APHYPIA Melichar

1908. *Aphypia* Melichar, *Acta Soc. ent. Bohem.* **5**:6. Haplotype, *Aphypia longipennis* Melichar.

Head with eyes narrower than pronotum. Vertex scarcely declivous except along middle line, broader across base than long in middle (2:1), produced before eyes for about a third of their length, median carina distinct, disk inclined downward laterad on each side of median carina, anterior margin carinate forming an angle of 110° at apex, lateral margins straight, diverging basad, posterior margin broadly excavate, frons moderately convex in profile basally, almost straight distally, longer in middle line than broad (1·4:1), widest part wider than base (1·2:1), basal margin truncate or slightly excavate, with a transverse triangular callus of moderate width between middle line and lateral margins, median carina distinct, raised on a broad median ridge, percurrent, lateral margins carinate, straight to below level of antennae, thence only slightly incurved, foliate laterad in distal half, disk of frons and clypeus longitudinally depressed on each side of middle line; clypeus fully three-quarters length of frons, medially and laterally carinate, antennae subovate, not sunk in a depression, ocelli not quite touching eyes, eyes distinctly excavate beneath, not much overlapping pronotum. Pronotum moderately short, laterally rather long, anterior margin of disk truncate, posterior margin subangulately concave, median carina present, lateral carinae of disk straight or slightly convex, distinctly attaining hind margin, each three times as long as median carina, pronotum laterad of disk distinctly inclined anteroventrally, a carina on each side between eye and tegula,

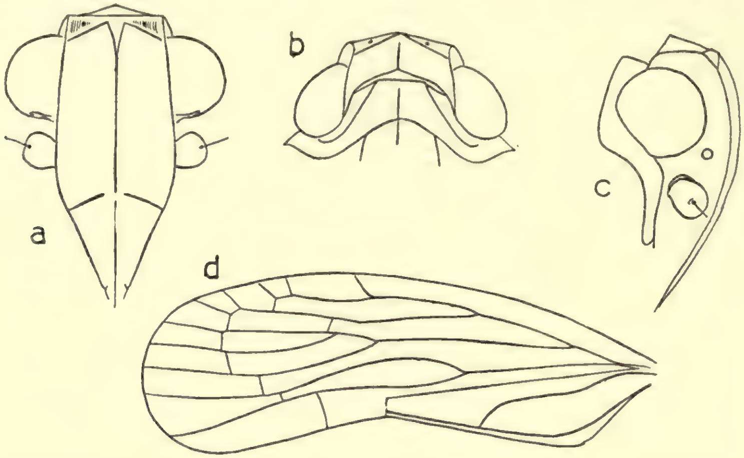

FIG. 52. *Agandecca annectens* White.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen.

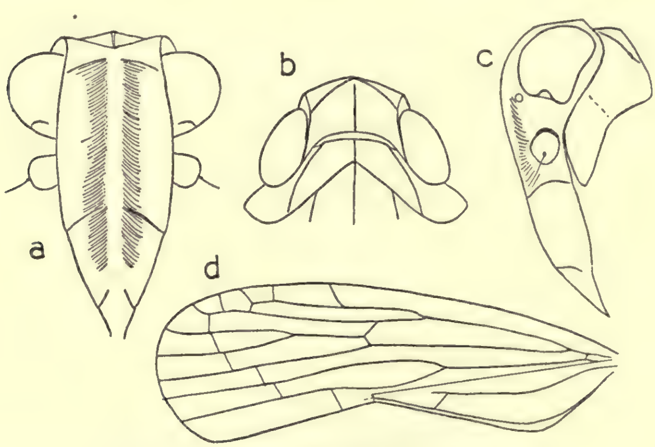

FIG. 53. *Aphypia longipennis* Melichar.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen.

ventral margin of lateral lobes angulate and oblique; mesonotum fully twice as long as vertex and pronotum combined, distinctly tricarinate, carinae more or less parallel; tegulae not carinate; post-tibiae with a single spine basad of middle.

Tegmina relatively long (3·2:1), costal margin slightly convex, Sc+R fork about level with Cu1 fork, both near level of union of claval veins, M forked level with apex of clavus, nine apical areoles distad of stigma; clavus terminating at middle of tegmen.

Aphypia longipennis Melichar

(FIG. 53)

1908. *Aphypia longipennis* Melichar, loc. cit.:6.

The figures are of a specimen in the British Museum.

The genus differs from *Agandecca*, which it resembles, in the proportions of vertex and frons, in the length of the pronotum, the structure of its disk, and the shape of the ventral margin of its lateral lobes. The genus is confined to Africa and is monotypic.

PROSAGANDECCA gen. n.

Head with eyes slightly narrower than pronotum. Vertex not declivous, broader across base than long in middle (2:1), produced before eyes for a third of their length, median carina present only basally, disk depressed, anterior margin carinate forming an angle of 145° at apex, lateral margins carinate, straight, scarcely diverging basad, posterior margin broadly excavate; frons moderately convex in profile, longer in middle than broad (1·3:1), widest part wider than base (1·4:1), basal margin truncate, devoid of callus, median carina distinct, percurrent, lateral margins carinate, convex, moderately incurved below level of antennae, slightly foliate laterad distally, disk of frons not depressed; clypeus about three-quarters length of frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli narrowly separated from eyes, eyes distinctly excavate beneath, moderately overlapping pronotum. Pronotum short, anterior margin of disk truncate, posterior margin deeply concave, median carina present, lateral carinae of disk straight, attaining hind margin, each four times as long as median carina, pronotum laterad of disk strongly inclined anteroventrally, ventral margin of lateral lobes angulate and oblique; mesonotum fully twice as long as vertex and pronotum combined, tricarinate; post-tibiae with a single spine basad of middle.

Tegmina three times as long as broad, costal margin very slightly convex, Sc+R fork about level with Cu1 fork, both distad of union of claval veins, M forked level with node, eight apical areoles distad of stigma; clavus terminating at middle of tegmen.

Anal segment of male short, tapering convexly to apex. Medioventral process of pygofer quadrate.

Type species, *Prosagandecca straminea* sp. n.

Prosagandecca straminea sp. n.

(FIG. 54)

Male: length, 2·5 mm.; tegmen, 4·0 mm.

Testaceous; pronotum, carinae of mesonotum, legs and abdomen stramineous. Tegmina translucent, stramineous. Wings hyaline, veins testaceous.

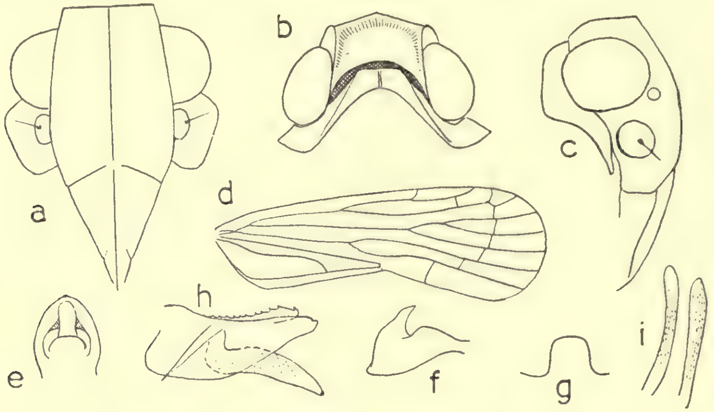

FIG. 54. *Prosagandecca straminea*, gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, anal segment of male; *f*, right genital style; *g*, medioventral process of pygofer; *h*, aedeagus; *i*, apical portion of phallic appendages.

Genital styles convex on ventral margin, sinuate dorsally, produced dorsally in a pointed process apically.

Aedeagus with phallobase comprising a pair of dentate lobes dorsally, a pair of lateral lobes tapering distally with dorsal margin straight and ventral margin convex, ventrally a pair of moderately broad lobes tapering distally, markedly shagreened.

Described from one male taken at Njala, Sierra Leone, by E. Hargreaves (8 December 1930). The genus is distinguished from *Agandecca* and *Aphypia* by the shape of the vertex, pronotum, and frons and by the absence of a basal transverse callus on the frons.

PARAGANDECCA gen. n.

Head with eyes a little narrower than pronotum. Vertex not declivous, broader across base than long in middle (1·9:1), produced before eyes for a quarter of their length, median carina absent, disk slightly depressed, anterior margin carinate forming an angle of 130° at apex, lateral margins carinate, straight, scarcely diverging basad, posterior margin almost transverse with a slight medial notch; frons shallowly convex in profile, longer in middle line than broad (1·4:1), widest part wider than base (1·6:1), basal margin shallowly angularly excavate, median carina distinct, percurrent, a series of three obsolete transverse ridges, interrupted by median carina on disk, in basal quarter, lateral margins carinate, straight or shallowly concave, diverging to below level of antennae thence incurved, slightly foliate laterad in distal part, disk of frons not depressed; clypeus about half as long as frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae small, subglobose, not sunk in a depression, ocelli narrowly separated from eyes, eyes slightly excavate beneath, moderately overlapping pronotum.

Pronotum distinctly short, anterior margin of disk truncate, posterior margin shallowly concave, median carina present, an impression on disk on each side of middle line, lateral carinae of disk straight or shallowly concave, diverging basad, attaining hind margin, each twice as long as median carina, pronotum laterad of disk strongly inclined anteroventrally, ventral margin of lateral lobes transverse; mesonotum longer than vertex and pronotum together, tricarinate, anterior part of disk convex, basal part markedly depressed, tegulae not carinate, post-tibiae with a single spine basad of middle.

Tegmina nearly three times as long as broad, costal margin slightly convex, Sc+R fork level with Cu1 fork, both slightly distad of union of claval veins, M forked level with node, eight apical areoles distad of stigma; clavus terminating slightly basad of middle of tegmen. Wings with R simple to apex, M two-branched, Cu1 three-branched.

Posterior margin of seventh sternite of female sinuate, slightly emarginate medially. Ventral lobes of first valvulae subtriangular, tapering distally. Bursa copulatrix armed with a trispinose sclerite at entrance.

Type species, *Paragandecca longibursata* sp. n.

Paragandecca longibursata sp. n.

(FIG. 55)

Female: length, 3·1 mm.; tegmen, 3·9 mm.

Fuscous-piceous; carinae of vertex, a V-shaped mark in middle of frons and six short transverse bands at each margin, a transverse band on clypeus, carinae of pronotum and of anterior half of mesonotum, together with a transverse band joining their bases, posterolateral margins, lower side of thorax, apex of pro-femora, meso-femora, and post-tarsi, testaceous-stramineous.

Tegmina fuscous-piceous, with a callus at node, C and Sc+R reddish-brown, apical margin tinged with red; most of costal cell and a large spot basad of node, a few cross veins in corium and apical line of veins in membrane ivory, veins otherwise testaceous. Wings smoky, margin tinged with red.

First valvulae of ovipositor bearing four long oblique spines, the apical pair slightly exceeding the others. Third valvulae with apical margin oblique. Bursa copulatrix three times as long as broad with a single sclerite at entrance, this sclerite crescentic with a long spine at middle.

Described from one female collected at Camp 2 (2,000 ft.), Sabron, Cyclops Mountains, Dutch New Guinea, by L. E. Cheesman (July 1936). Brit. Mus. 1936–271. Type in Brit. Mus. (N.H.).

Paragandecca differs from *Agandecca* and *Aphypia* in the absence of a basal transverse callus on the frons, and in the shape and proportions of the frons, vertex, and pronotum. It is separated from *Prosagandecca* by the shape of the frons, the differently shaped pronotal disk, by the transverse ventral margins of the lateral pronotal lobes, and by the relative size of the antennae. The genus contains at present only the above species.

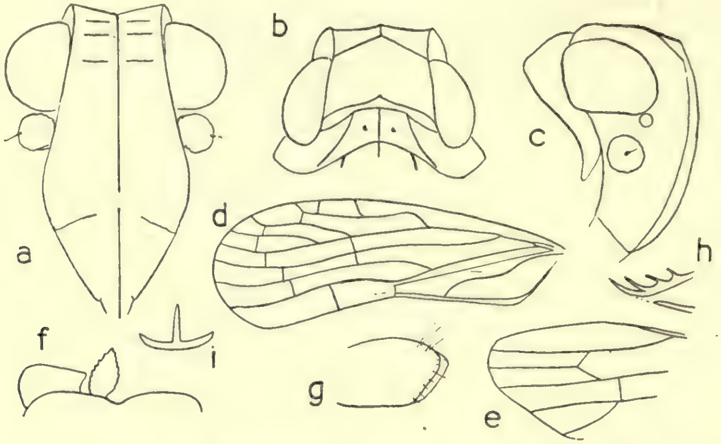

FIG. 55. *Paragandecca longibursata*, gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of wing; *f*, posterior margin pregenital sternite, ventral lobe of right first valvula, ventral portion of eighth segment, right side; *g*, third valvula; *h*, spines of first valvula; *i*, sclerite at entrance to bursa copulatrix.

CHRONEBA Stål

1859. *Chroneba* Stål, *Berl. ent. Z.* **3**:320. Haplotype, *Chroneba pallifrons* Stål.

Head with eyes much narrower than pronotum. Vertex in profile convex, not declivous, shorter across base than long in middle line (1:4), produced before eyes for two-thirds of their length, median carina foliate, percurrent, disk hollowed out on each side of middle, anterior margin angulate, not carinate, vertex rounding into frons, lateral margins straight, parallel, foliately raised, posterior margin deeply excavate; frons straight in profile, longer in middle line than broad (2·2:1), widest part wider than base (4:1), basal margin not distinct, median carina prominent, percurrent, lateral margins prominently carinate, foliate laterad, sinuately expanding to below level of antennae, thence incurved to suture; clypeus about three-quarters length of frons, medially and laterally carinate, antennae subovate, not sunk in a depression, ocelli remote from eyes, eyes excavate beneath, moderately overlapping pronotum. Pronotum very short, laterally longer than in middle, disk relatively very small, anterior margin strongly convex, produced to fit into emargination of vertex, posterior margin angularly excavate, median carina present, lateral carinae of disk sinuate, attaining hind margin, each twice as long as median carina, pronotum laterad of disk moderately inclined anteroventrally, a pair of carinae on each side between eye and tegula, ventral margin of lateral lobes angulate and oblique, mesonotum longer than vertex and pronotum together, tricarinate; pro-tibiae as long as pro-femora with trochanters; post-tibiae with a single spine basad of middle.

Tegmina relatively long, 3·2 times longer than wide, costal margin slightly convex, sutural margin forming a re-entrant angle of 155° at apex of clavus, Sc+R fork distad of Cu1 fork, level with apex of clavus, M fork level with node, nine apical areoles distad of stigma; clavus terminating distad of middle of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Chroneba pallifrons Stål

(FIG. 56)

1859. *Chroneba pallifrons* Stål, loc. cit.: 320.

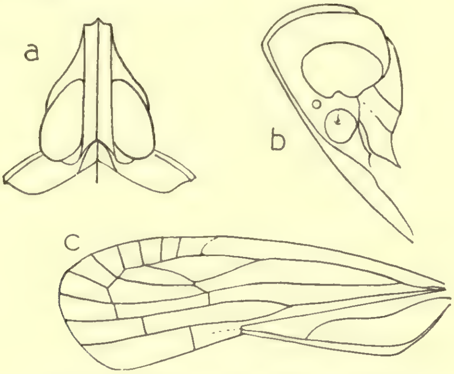

FIG. 56. *Chroneba pallifrons* Stål.
a, vertex and pronotum; *b*, head in profile; *c*, tegmen.

Figures are given of a specimen in the British Museum. The degree of stenogenesis of the head in *Chroneba* is unparalleled in the family, though it is possible to see in *Parakosalya* Distant a transitional phase from the normal condition as exemplified by *Akotropis* Matsumura. The genus is known only from Ceylon.

TANGINA Melichar

1903. *Tangina* Melichar, *Hom. Fauna Ceylon*: 44. Haplotype, *Tangina bipunctata* Melichar.

Head with eyes slightly narrower than pronotum. Vertex broader than long in middle line (about 1·5:1), not declivous, scarcely produced before eyes, median carina distinct, anterior margin carinate, convex, lateral margins straight, subparallel or scarcely diverging basally, carinate, posterior margin broadly excavate, frons shallowly convex in profile, longer in middle line than broad (1·5:1), widest part wider than base (1·5:1), median carina percurrent, lateral margins carinate, straight except when near suture, disk not depressed; clypeus more than three-quarters length of frons, medially and laterally carinate, antennae subglobose, not sunk in a depression, eyes moderately overlapping pronotum. Pronotum moderately short, scarcely as long as vertex in middle line, anterior margin of disk shallowly convex, posterior margin concave, median carina present, lateral carinae of disk concave, attaining posterior margin near side, each fully twice as long as median carina, pronotum laterad of disk not inclined anteroventrally; mesonotum scarcely twice as long as vertex and pronotum combined, distinctly tricarinate, lateral carinae slightly diverging basad; post-tibiae with a single spine basad of middle.

Tegmina moderately long, three times longer than wide, anterior margin slightly convex, sutural margin forming a re-entrant angle of 150°, Sc+R fork obscure, about level with Cu1 fork, latter level with union in clavus, M forked at level of node apparently eight apical areoles distad of stigma; clavus terminating at or slightly distad of middle of tegmen. Wings with R simple to apex, M two-branched, Cu1 three-branched.

Tangina bipunctata Melichar

(Fig. 57)

1903. *Tangina bipunctata* Melichar, loc. cit.: 44, pl. 2, figs. 19, *a*, *b*, *c*.

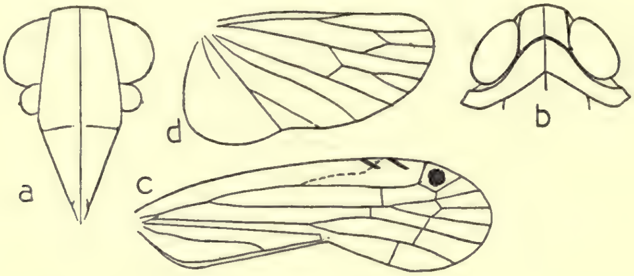

Fig. 57. *Tangina bipunctata* Melichar.
a, frons and clypeus; *b*, vertex and pronotum; *c*, tegmen with Sc added in broken line according to Melichar's correction; *d*, wing.

The figures are after Melichar. A species before the writer has laterobasal facets on frons, a rostrum only reaching mesotrochanters, and concave lateral discal pronotal carinae reaching hind margin sublaterally; Cu1 in tegmen forks level with union of claval veins. This species runs to *Nephelia* but differs in shape of frons.

CLUSIVIUS Distant

1917. *Clusivius* Distant, *Trans. Linn. Soc. Lond.* (*Zool.*) **17**: 277. Haplotype, *Clusivius spectabilis* Distant.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, slightly broader across the base than long in middle line (1·1:1), produced before eyes for a third of their length, median carina prominent, percurrent, disk slightly hollowed out on each side of middle, anterior margin angulate, not carinate, vertex rounding into frons, lateral margins concave, carinate and slightly raised, slightly diverging basad, posterior margin shallowly angularly excavate; frons convex in profile, scarcely longer in middle line than broad, widest part wider than base (1·5:1), basal margin not distinct, apparent margin angulately convex, median carina prominent, percurrent, lateral margins carinate, slightly foliate laterad, distinctly convex, expanding to level of antennae, thence incurved to suture; clypeus exceeding three-quarters length of frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli remote from eyes, eyes not excavate beneath, scarcely overlapping pronotum. Pronotum moderately convex, posterior margin correspondingly concave, median carina distinct, lateral carinae of disk obsolete, pronotum laterad of disk not inclined anteroventrally, ventral margin of lateral lobes angulate and oblique; mesonotum longer than vertex and pronotum together, tricarinate, lateral carinae straight, diverging basad, pro-tibiae longer than pro-femora, post-tibiae with a single spine basad of middle.

Tegmina 2·8 times longer than wide, costal margin slightly convex, posterior margin forming a re-entrant angle of 160° at apex of clavus, Sc+R fork about level with Cu1 fork, both basad of apex of clavus and distad of union of claval veins, M fork just basad of node, seven apical areoles distad of stigma; clavus terminating basad of middle of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Clusivius spectabilis Distant

(Fig. 58)

1917. *Clusivius spectabilis* Distant, loc. cit.:277, pl. 49, fig. 15.

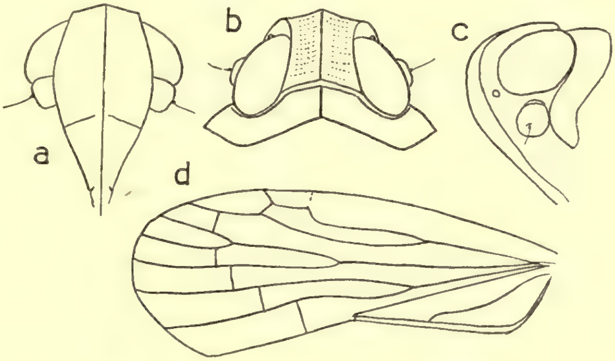

Fig. 58. *Clusivius spectabilis* Distant.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen.

The figures are of the holotype. *Clusivius*, known only from the Seychelles, is distinguished by the shape of the vertex, frons, pronotum, and by the tegminal venation and the relatively short clavus. In the type species the tegulae are carinate and relatively large.

PARAKOSALYA Distant

1917. *Parakosalya* Distant, *Trans. Linn. Soc. Lond.* (*Zool.*) **17**:287. Orthotype, *Parakosalya insularis* Distant.

Head with eyes distinctly narrower than pronotum. Vertex longer in middle line than broad (1·1:1), not declivous, produced before eyes for half their length, median carina prominent, disk hollowed out on each side of middle, apparent anterior margin angulate, not carinate, vertex rounding into frons, lateral margins straight, prominent, diverging basad, posterior margin obtusely angulately excavate; frons slightly convex in profile, longer in middle line than broad (1·6:1), widest part wider than base (2·3:1), apparent basal margin sinuate, subangulate medially, median carina prominent, subfoliate, percurrent, lateral margins carinate, slightly foliate laterad, sinuately expanding to below level of antennae, thence incurved to suture, suture strongly impressed; clypeus three-quarters of length of frons, medially and laterally carinate, convex except at base, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli remote from eyes, eyes not excavate beneath, moderately overlapping pronotum. Pronotum moderately short, distinctly short laterad of disk, disk relatively large, anterior margin truncate, posterior margin angulately excavate (about 115°), median carina prominent, an impression on disk on each side of it, lateral carinae of disk straight, diverging basad, attaining hind margin, each twice as long as median carina, pronotum laterad of disk markedly inclined anteroventrally, no carina between eye and tegula, ventral margin of lateral lobes slightly oblique; mesonotum longer than vertex and pronotum together, tricarinate; pro-tibiae subequal to pro-femora, post-tibiae with a single spine just basad of middle.

Tegmina about 2·7 times as long as wide, costal margin slightly convex, M forked near level of node, nine apical areoles distad of stigma; clavus terminating slightly basad of middle of tegmen. Wings with R simple, M two-branched, Cu1a three-branched.

Parakosalya insularis Distant

(FIG. 59)

1917. *Parakosalya insularis* Distant, loc. cit.: 287.

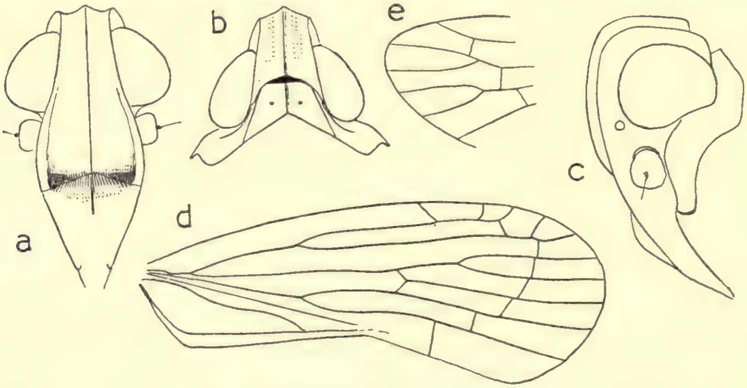

FIG. 59. *Parakosalya insularis* Distant.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of wing.

The figures are of Distant's holotype. The genus is known only from the Seychelles.

CNIDUS

1866. *Cnidus* Stål, *Hemipt. Africana* **4**: 185. Haplotype, *Cixius variegatus* Stål.

Head with eyes distinctly narrower than pronotum. Vertex slightly declivous, as long in middle line as broad across base, produced before eyes for half their length, median carina present, prominent near base, disk hollowed, anterior margin carinate, rounded, a large but not distinct triangular areolet at each latero-apical angle of head almost in same plane as gena, lateral margins carinate, foliate, convex, rather closely approximated distally, diverging basad, posterior margin truncate; frons slightly convex in profile, a little longer in middle line than broad (1·1:1), widest part three times width at base, basal margin convex-truncate, median carina prominent near base, percurrent, lateral margins carinate, distinctly foliate laterad, convex, diverging to below level of antennae, thence incurved to suture; clypeus fully three-quarters of length of frons in middle line, medially and laterally carinate, rostrum with subapical segment equal to apical, antennae with second segment subglobose, sunk in a depression, ocelli touching eyes, eyes ovate, excavate beneath, only slightly overlapping pronotum. Pronotum moderately short, distinctly shorter behind eyes than in middle line, anterior margin of disk truncate, posterior margin angulately excavate (120°), median carina distinct, lateral carinae of disk slightly convex, each 1·3 times length of median carina, attaining hind margin, pronotum laterad of disk not inclined anteroventrally, with three shallow depressions on each side, two distinct carinae at each lateral margin between eye and tegula, ventral margin of lateral pronotal lobes slightly oblique; mesonotum longer than vertex and pronotum combined, tricarinate; tegulae not carinate; pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina slightly more than three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 155° at apex of clavus, Sc+R fork level with Cu1 fork, both slightly distad of union of claval veins, M forked a little basad of level of node, eight or nine areoles around apical margin distad of stigmal cell; clavus terminating distad of middle of tegmen.

Cnidus variegatus Stål

(FIG. 60)

1855. *Cixius variegatus* Stål, *Öfvers. Vetensk. Akad. Förh. Stockh.* **12**:92.

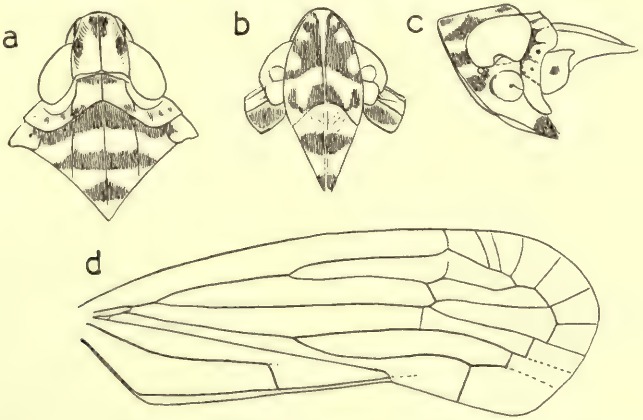

FIG. 60. *Cnidus variegatus* Stål.
a, vertex, pronotum, and mesonotum; *b*, frons and clypeus; *c*, head in profile; *d*, tegmen.

Posterior margin of seventh sternite of female slightly convex in middle.

The figures are of the holotype. One tegmen is damaged and the other crumpled so that the apical venation of Cu1 was not seen, but the basal venation suggests that it is of the normal type.

Cnidus differs from *Magadha* and *Catonia* in the forking of M1+2 and in the angle of inclination of the latero-apical facets on the vertex.

PARACLUSIVIUS gen. n.

Head with eyes distinctly narrower than pronotum. Vertex slightly declivous, as long as broad or slightly longer, produced before eyes for half their length, strongly medially carinate, anteriorly devoid of a transverse carina, curving into frons, apex of head in dorsal view angulately convex (about 130°), lateral margins straight, diverging basad, posterior margin shallowly concave; frons shallowly convex in profile, longer in middle line than broad (about 1·4:1), widest part wider than base (1·9:1), median carina percurrent, lateral margins carinate, foliate laterad; clypeus fully three-quarters as long as frons, medially and laterally carinate, disk, frons, and clypeus slightly concave on each side of middle line, rostrum with subapical segment longer than apical (about 1·2:1), antennae subglobose, not sunk in a depression, ocelli not touching eyes, eyes not extensively overlapping pronotum. Pronotum moderately long, anterior margin of disk convex-truncate, posterior margin angulately excavate (120°), median carina present, lateral carinae of disk straight, each 1·4 times as long as median carina, pronotum laterad of disk slightly inclined antero-ventrally, two carinae at each lateral margin between eye and tegula, ventral margins of lateral lobes angulate and oblique; mesonotum longer than vertex and pronotum combined, tricarinate; pro-tibiae about as long as pro-femora and trochanters, post-tibiae with a single spine at middle.

Tegmina three times as long as broad, Sc+R forked about one-third from base, level with Cu1 fork and union of claval veins, M1+2 forking slightly distad of level of apex of clavus, about eight apical areoles in Sc and R distad of stigma, five in M and Cu, clavus terminating at or distad of middle of tegmina.

Type species, *Paraclusivius tristis* sp. n.

Paraclusivius tristis sp. n.

(FIG. 61)

Female: length, 4·0 mm.; tegmen, 5·4 mm.

Fuscous-piceous; carinae of frons, sides of head above eye, lateral margin of pronotum and lateral pronotal carinae, dorsal half of tegulae and hind legs testaceous; a line on genae subparallel to front of eye piceous. Tegmina with corium fuscous-piceous, membrane fuscous, veins concolorous; wings fuscous, veins concolorous.

Posterior margin of seventh abdominal sternite of female shallowly convex through an angle of 150°. Subvaginal plate about seven times as broad as deep, longer on ventral than on dorsal margin. First valvulae of ovipositor with ventral lobes short, broader than long; third valvulae subquadrate with an eminence on dorsal margin.

Bursa copulatrix beset with feebly-sclerotized rings, and furnished near entrance with a crescentic sclerite bearing a spine at middle.

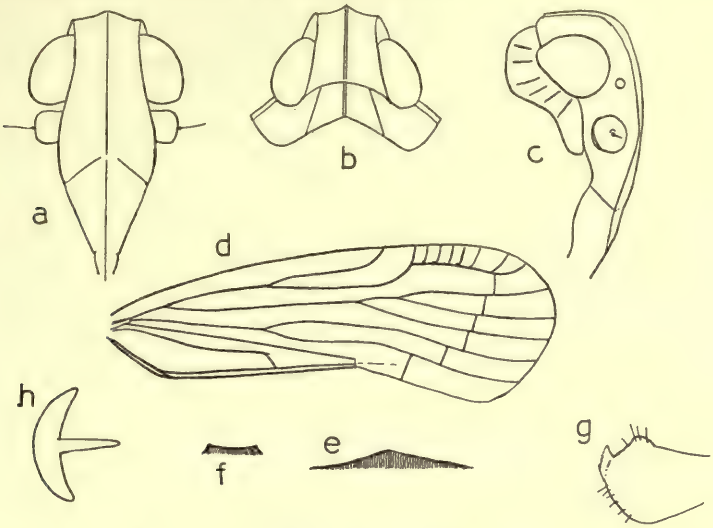

FIG. 61. *Paraclusivius tristis*, gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, posterior margin of pregenital sternite of female; *f*, subvaginal plate; *g*, third valvula of ovipositor, lateral view; *h*, sclerite near entrance to bursa copulatrix.

Described from two females in British Museum, one taken at Njala, Sierra Leone (E. Hargreaves, 14 October 1932) and the other in the Gold Coast (A. E. Evans, 1913). *Paraclusivius* differs from *Akotropis* in having the subapical segment of the rostrum longer than the apical and in having two carinae at the lateral margins of the pronotum and no carina between vertex and frons, as well as in its larger size.

AKOTROPIS Matsumura

1914. *Akotropis* Matsumura, *Ann. hist.-nat. Mus. hung.* **12**:270. Logotype, *Akotropis fumata* Matsumura.

1941. *Ballonymus* Jacobi, *Zool. Jb.* (*Syst.*) **74**:295. Orthotype, *Ballonymus anticus* Jacobi, loc. cit.:296.

Head with eyes distinctly narrower than pronotum. Vertex broader across base than long in middle line (1·1:1), not or scarcely declivous, produced before eyes for rather less than half their length, median carina prominent, elevated, anterior margin angulate, not carinate, subangulately rounding into frons, lateral margins carinate, straight, or slightly concave, diverging basad, posterior margin angulately excavate (about 140°); frons slightly convex in profile, longer in middle line than broad (1·5:1), widest part wider than base (1·4:1), basal margin not distinct, median carina prominent, percurrent, lateral margins carinate, slightly foliate laterad distally, expanding to below level of antennae, thence incurved to suture; clypeus about two-thirds length of frons, medially and laterally carinate, antennae subovate, about as long as eyes are wide, not sunk in a depression, genae broad, ocelli remote from eyes,

eyes not excavate beneath, only slightly overlapping pronotum. Pronotum moderately short, not quite as long behind eyes as in middle line, anterior margin of disk truncate-convex, posterior margin angulately excavate (130°), median carina present, lateral carinae of disk straight or slightly convex, diverging basad, attaining hind margin, each about 1·6 times as long as median carina, pronotum laterad of disk only moderately inclined anteroventrally, ventral margins of lateral lobes angulate and oblique; mesonotum longer than vertex and pronotum together, tricarinate; pro-tibiae slightly exceeding pro-femora and trochanters, or subequal; post-tibiae with a single spine basad of middle.

Tegmina 2·6 times as long as wide, costal margin slightly convex, sutural margin forming a re-entrant angle of about 155° at apex of clavus, Sc+R fork and Cu1 fork at same level, both slightly distad of union of claval veins, M fork just basad of level of node, eight apical areoles distad of stigma: clavus terminating basad of middle of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Akotropis fumata Matsumura

(FIG. 62)

1914. *Akotropis fumata* Matsumura, loc. cit.: 270, fig. 4.

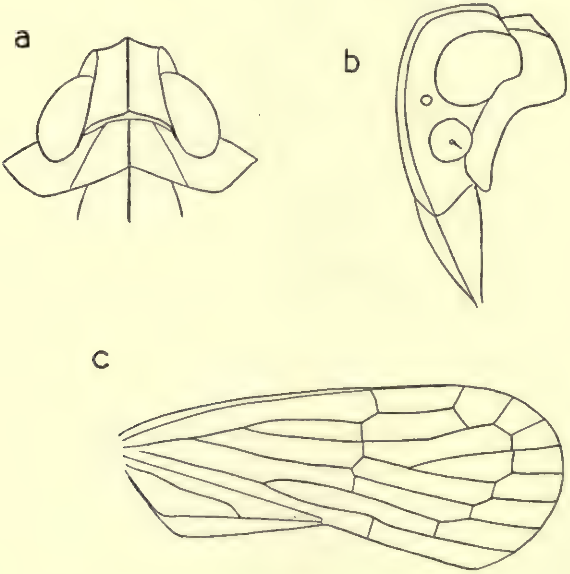

FIG. 62. *Akotropis fumata* Matsumura.
a, vertex and pronotum; *b*, head in profile; *c*, tegmen.

The figures are of a specimen in the British Museum. *Akotropis* differs from *Parakosalya* and *Clusivius* in the shape of the vertex and pronotum. It appears to be nearest to the former, but, apart from the above character, is separated from it by the absence of a deeply impressed frontoclypeal suture and a distinctly less tumid clypeus. The genus, as so far known, is Oriental.

KOLOPTERA Metcalf

1938. *Koloptera* Metcalf, *Bull. Mus. comp. Zool. Harv.* **82**:371. Orthotype, *Koloptera callosa* Metcalf.

Head with eyes narrower than pronotum. Vertex longer in middle line than broad across base (1·5:1), not declivous, produced before eyes for nine-tenths of their length, median carina distinct, anterior margin rounded, carinate, lateral margins straight or slightly sinuate, diverging basad, posterior margin angulately excavate (110°); frons more or less straight in profile, longer in middle line than broad (1·6:1), widest part wider than base (2·2:1), basal margin convex, median carina distinct, percurrent, lateral margins carinate, sinuate to level of antennae then foliately expanded laterad and incurved to suture; clypeus about three-fifths of length of frons, medially and laterally carinate, antennae subglobose, slightly concealed below eyes, ocelli just touching eyes, eyes excavate beneath, not overlapping pronotum, a horizontal carina on genae between eyes and anterior margin. Pronotum moderately short, almost as long behind eyes as in middle line, anterior margin convex, posterior margin correspondingly concave, median carina present, lateral carinae of disk straight, diverging basad, attaining hind margin, each slightly longer than median carina (1·1:1), pronotum laterad of disk not inclined anteriorly, three supernumerary carinae on each side, lateral margins bicarinate, ventral margin of lateral lobes oblique; mesonotum only slightly longer than vertex and pronotum combined, tricarinate, but median carina obsolete on basal third; pro-tibiae as long as pro-femora with trochanters; post-tibiae with a single spine basad of middle.

Tegmina about three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 158° at apex of clavus, Sc+R fork distinctly basad of Cu1 fork, about level with union of claval veins, Cu1 fork basad of apex of clavus, Cu1b distinctly convex distad of apex of clavus, M fork level with node, R, M, and Cu1a converging to nodal line, a fold extending inward from node across stigmal cell, with a small callus in basal portion and a large callus in distal portion of cell, first apical areole distad of this also with a callus, six apical areoles following this cell; clavus terminating markedly distad of middle.

Koloptera longiceps (Fowler) comb. n.

(FIG. 63)

1904. *Helicoptera longiceps* Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**:107, pl. 11, figs. 17, *a*, *b*.
1938. *Koloptera callosa* Metcalf, *Bull. Mus. comp. Zool. Harv.* **82**:372.

The writer has seen both types and is unable to separate them. Specimens differing in no appreciable particular from the Central American series have been taken by the writer in Trinidad, B.W.I. The species *callosa* was erected in the belief (*fide* pl. 11, fig. 17, of the *Biologia*) that Fowler's species did not possess the transverse nodal fold: this fold, however, is present in all the *Biologia* material of *longiceps* in the British Museum. The figures given above are of Fowler's type.

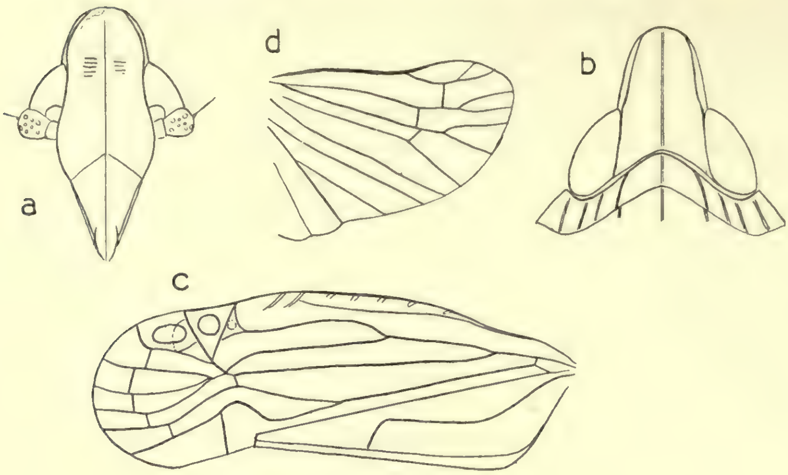

FIG. 63. *Koloptera longiceps* (Fowler).
a, frons and clypeus; *b*, vertex and pronotum; *c*, tegmen; *d*, wing.

CALLICHLAMYS Kirkaldy

1907. *Callichlamys* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **3**:116, 120.
Logotype, *Callichlamys muiri* Kirkaldy.

Head with eyes rather narrower than pronotum. Vertex horizontal, longer in middle line than broad across base (2·3:1), produced before eyes for at least their length, median carina distinct, disk slightly hollowed out on each side, anterior margin carinate and slightly calloused, almost semi-circularly rounded, lateral margins carinate, slightly convex, diverging posteriorly as far as anterior margin of eyes then parallel, posterior margin transverse with a slight median notch; frons straight in profile, longer in middle line than broad (1·8:1), widest part wider than base (3:1), basal margin convex, median carina distinct, calloused at base, percurrent, lateral margins carinate sinuately expanding to level of antennae thence incurved to suture, slightly foliate at level of antennae, disk of frons not depressed; clypeus short, slightly less than half length of frons, flat, laterally carinate, median carina obscure, subapical segment of rostrum longer than apical, antennae subglobose, not sunk in a depression, ocelli remote from eyes, eyes narrowly oval, distinctly excavate beneath, not overlapping pronotum. Pronotum moderately short, almost as long behind eyes as in middle line, anterior margin of disk truncate, posterior margin angulately excavate, median carina present, lateral carinae of disk shallowly convex, each twice as long as median carina, pronotum laterad of disk not inclined anteroventrally, lateral margin carinate between eye and tegula, ventral margin of lateral pronotal lobes slightly oblique; mesonotum shorter than vertex and pronotum combined, tricarinate, carinae parallel, tegulae obsoletely carinate; pro-tibiae shorter than profemora and trochanters, post-tibiae with a single spine basad of middle.

Tegmina three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 160° at apex of clavus, Sc+R fork slightly basad of CuI fork and about level with union of claval veins, M forked level with node, seven apical areoles distad of stigma; clavus terminating slightly distad of middle of tegmen. Wings with R simple, M two-branched, CuI three-branched.

Callichlamys muiri Kirkaldy

(FIG. 64)

1907. *Callichlamys muiri* Kirkaldy, loc. cit.: 120, pl. 9, figs. 20, 21.

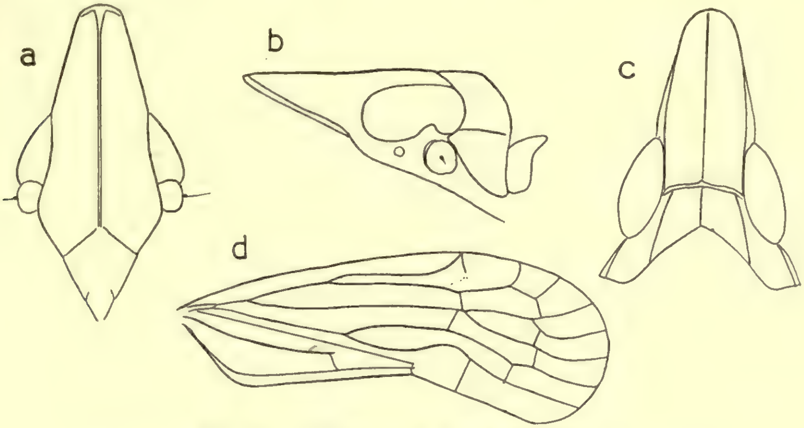

FIG. 64. *Callichlamys muiri* Kirkaldy.
a, frons and clypeus; *b*, head in profile; *c*, vertex and pronotum; *d*, tegmen.

The figures are of a paratype in the British Museum. *Callichlamys* is readily recognizable by the shape of the vertex and frons. Its affinities, to judge by external characters, would seem to lie with *Callinesia* and perhaps with *Caristianus*. The genus is so far known only from the Fiji Islands.

KARDOPOCEPHALUS Metcalf

1938. *Kardopocephalus* Metcalf, *Bull. Mus. comp. Zool. Harv.* **82**: 379.
Orthotype, *Kardopocephalus lineatus* Metcalf.

Head with eyes markedly narrower than pronotum. Vertex horizontal, longer in middle line than broad across base (2·8 : 1), produced before eyes for slightly less than twice their length, median carina present only in basal third, disk deeply hollowed out, anterior margin carinate, acutely rounded, lateral margins carinate, gradually diverging basad, posterior margin subrectangularly excavate; frons longer in middle line than broad (2·5 : 1), widest part wider than base (6 : 1), basal margin conical, median carina distinct, percurrent, lateral margins carinate, slightly sinuately expanding to below level of antennae thence abruptly incurved to suture, disk markedly depressed; clypeus short, less than half length of frons, medially and laterally carinate, antennae small, subglobose, partly concealed below eyes and behind lateral margins of frons, eyes excavated beneath, not overlapping pronotum.

Pronotum moderately long, longer behind eyes than in middle line, anterior margin of disk acutely convex, posterior margin rectangularly excavate, median carina present, lateral carinae of disk convex, attaining hind margin, each almost twice as long as median carina, pronotum laterad of disk not at all inclined anteroventrally, three supernumerary carinae behind eyes, lateral margins carinate; mesonotum as long as vertex and pronotum combined, tricarinate; tegulae carinate; post-tibiae with spine obsolete.

Tegmina three times as long as broad, costal margin slightly convex, Sc+R fork about one-third from base, Cu1 fork level with union of claval veins, M forking about level with node, stigmal area with about four cells, two callosities present in cells distad of this area, R, M, and Cu1a subparallel, not converging to nodal line; clavus terminating distad of middle of tegmen.

Kardopocephalus lineatus Metcalf

(Fig. 65)

1938. *Kardopocephalus lineatus* Metcalf, loc. cit.: 380.

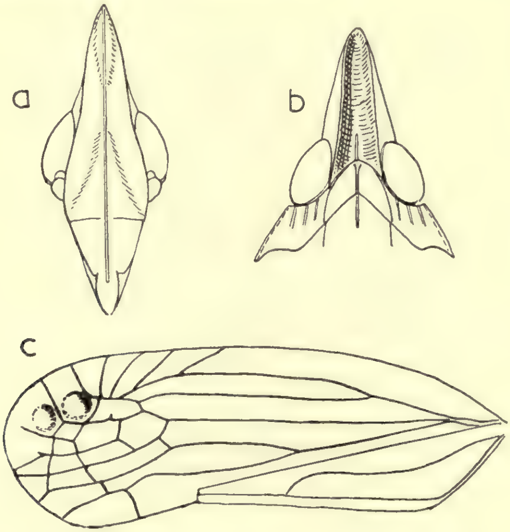

Fig. 65. *Kardopocephalus lineatus* Metcalf.
a, frons and clypeus; *b*, vertex and pronotum; *c*, tegmen.

The writer has not seen material of this species and the above is based on the original description and figures. The genus is as yet known only from Central America; its affinities would seem to lie with *Koloptera*.

PARATANGIA Melichar

1903. *Paratangia* Melichar, *Hom. Fauna Ceylon*: 46. Logotype, *Paratangia notata* Melichar, loc. cit. 46.

Head with eyes narrower than pronotum. Vertex not or slightly declivous, broader across base than long in middle line (1·3 : 1), produced before eyes for about half their length, median carina present in basal half only, disk slightly depressed, anterior margin carinate, strongly convex, lateral margins subfoliately carinate, convex, diverging basad, posterior margin concave with a slight median notch; frons almost straight in profile, longer in middle line than broad (1·1:1), widest part wider than base (3:1) basal margin truncate, with a triangular transverse callus on each side of middle, median carina distinct, thickened basad, percurrent, lateral margins carinate, strongly diverging to below level of antennae thence strongly incurved to suture, so that frons and clypeus together appear rhomboidal, carinae foliately produced laterad at level of antennae, disk of frons not depressed; clypeus fully three-quarters length of frons, laterally carinate, median carina weak or obsolete, rostrum with subapical segment longer than apical, antennae relatively prominent, subglobose, not sunk in a depression, ocelli touching eyes, eyes not markedly excavated beneath, moderately overlapping pronotum.

Pronotum short, much shorter behind eyes than in middle line, anterior margin of disk angulate-truncate, posterior margin subrectangularly excavate, median carina present, lateral carinae of disk straight or shallowly concave, attaining hind margin, each slightly more than twice length of median carina, pronotum laterad of disk strongly inclined anteroventrally, ventral margin of lateral lobes angulate and oblique, a weak carina between eyes and tegulae; mesonotum longer than vertex and pronotum together; tricarinate, tegulae not carinate; pro-tibiae shorter than profemora and trochanters; post-tibiae with a single spine close to middle.

Tegmina three times as long as broad, costal margin slightly convex, Sc+R fork, Cu1a fork and union of claval veins at same level, M forked nearly level with node, eight apical areoles distad of stigma; clavus terminating at middle of tegmen. Wings with R simple, M two-branched, Cu1a three-branched.

Paratangia sp.

(Fig. 66)

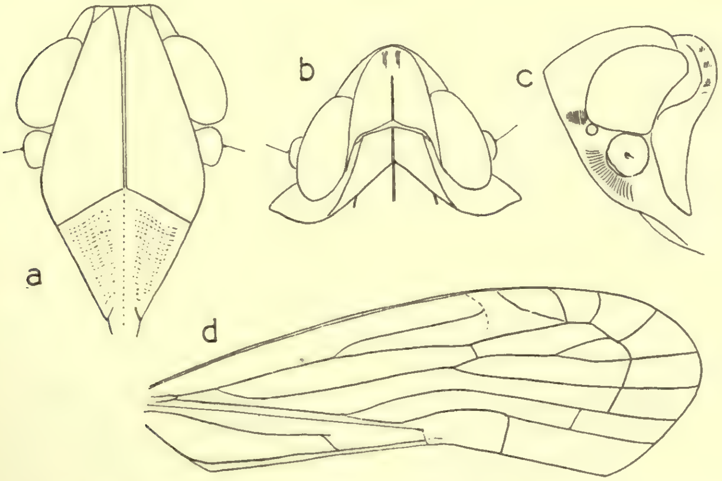

Fig. 66. *Paratangia* sp.
a, frons and clypeus; *b* vertex and pronotum; *c*, head in profile; *d*, tegmen.

The genus is distinguished by the shape of the frons, vertex, pronotum, and by the tegminal venation, and at present includes two described species, *notata* Mel. and *marginata* Mel. The figures are of an apparently undescribed species in the British Museum.

BETATROPIS Matsumura

1914. *Betatropis* Matsumura, *Ann. hist.-nat. Mus. hung.* **12**:274. Orthotype, *Betatropis formosana* Matsumura.

Head with eyes a little narrower than pronotum. Vertex not declivous, at least as long in middle as broad across base, sometimes much longer, produced before eyes for at least three-fifths of their length, median carina present near base, disk depressed, anterior margin carinate, acutely rounded, lateral margins carinate, convex, diverging basad, posterior margin deeply concave; frons almost straight in profile, longer in middle line than broad (about 2:1), widest part wider than base (about 4:1), basal margin convex, median carina distinct, percurrent, lateral margins carinate, straight and diverging to below level of antennae thence incurved to suture, slightly foliate laterad distally, disk of frons slightly inclined on each side of median carina; clypeus short, about half length of frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli remote from eyes, eyes not excavate beneath, slightly overlapping pronotum.

Pronotum rather short, shorter behind eyes than in middle line, anterior margin of disk truncate-convex, posterior margin subrectangularly excavate, median carina present, lateral carinae of disk straight, diverging basad, attaining hind margin, each about three times as long as median carina, pronotum laterad of disk only slightly inclined anteroventrally, with supernumerary carinae behind each eye, lateral margins bicarinate, ventral margin of lateral pronotal lobes angulate and oblique; mesonotum longer than vertex and pronotum combined, if only slightly so, tricarinate, lateral carinae straight, diverging basad, tegulae not carinate; pro-tibiae as long as pro-femora and trochanters, post-tibiae with a single spine basad of middle.

Tegmina three times as long as broad, costal margin slightly convex, Sc+R fork slightly distad of Cu1 fork, latter nearly level with union of claval veins, M forked at level of nodal line, eight apical areoles distad of stigma, Cu1b not deeply convex distad of apex of clavus, clavus terminating distad of middle of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Betatropis formosana Matsumura

1914. *Betatropis formosana* Matsumura, loc. cit.:275.

In this species the vertex is nearly twice as long in middle line as broad across base. *Betatropis* is distinguished by the shape of the frons, vertex, and pronotum and by the tegminal venation. It is known only from the Orient, and is distinguished from the Indian *Caristianus* by the structure of the pronotum and by the tegminal venation, as well as by the position of the ocelli and the shape of the eyes.

Betatropis horishana Matsumura

(Fig. 67)

1914. *Betatropis horishana* Matsumura, loc. cit.: 276.

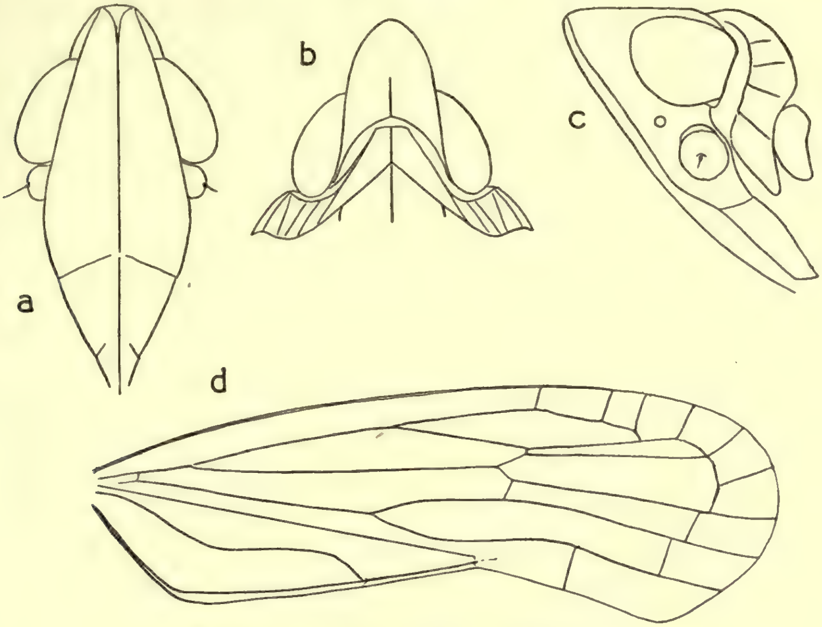

Fig. 67. *Betatropis horishana* Matsumura.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen.

The vertex in this species is only as long as wide. The two species listed are all that are at present included in the genus.

CARISTIANUS Distant

1916. *Caristianus* Distant, *Fauna Brit. Ind. Rhynch.* **6**: 63. Orthotype, *Caristianus indicus* Distant.

Head with eyes distinctly narrower than pronotum. Vertex slightly declivous, longer in middle than broad across base (1·3:1), produced before eyes for about half their length, median carina present, obsolete distally, disk strongly depressed, anterior margin carinate, strongly convex, lateral margins carinate, straight, diverging basad, posterior margin transverse; frons moderately convex in profile, longer in middle line than broad (about 1·8:1), widest part about three times as wide as base, basal margin convex-truncate, median carina distinct, percurrent, lateral margins carinate, sinuately diverging to level of antennae then gradually incurved to suture, rather obliquely foliate, disk of frons not depressed; clypeus more than half as long as frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli touching eyes, eyes distinctly excavate beneath, only slightly overlapping pronotum.

Pronotum moderately short, about as long behind eyes as in middle line, anterior margin of disk truncate, posterior margin angulately excavate (120°), median carina present, lateral carinae of disk straight, diverging basad, attaining hind margin, each not quite twice as long as median carina, two incomplete carinae between eye and tegula, pronotum laterad of disk slightly inclined anteroventrally, ventral margin of lateral lobes slightly oblique; mesonotum longer than vertex and pronotum together, tricarinate, lateral carinae straight, weakly divergent, tegulae not carinate; post-tibiae with a single spine basad of middle.

Tegmina three times as long as broad, costal margin slightly convex, Sc+R fork near basal quarter, basad of union of claval veins, M forked level with node, Cu1 fork basad of apex of clavus and distad of union of claval veins, seven apical areoles distad of stigma; clavus terminating distad of middle.

Caristianus indicus Distant

(Fig. 68)

1916. *Caristianus indicus* Distant, loc. cit.: 63.

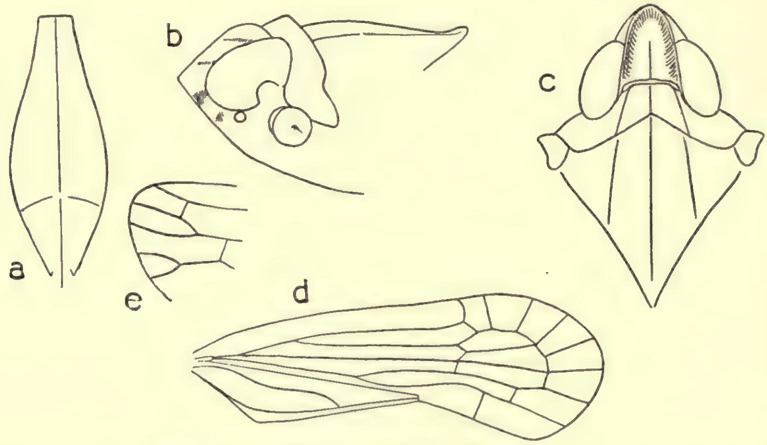

Fig. 68. *Caristianus indicus* Distant.

a, frons and clypeus; *b*, head in profile; *c*, vertex, pronotum, and mesonotum; *d*, tegmen; *e*, apex of wing.

The figures are of Distant's holotype. *Caristianus* is distinguished by the shape of the frons, vertex, pronotum, and by the tegminal venation. The genus is known only from Ceylon and Sarawak.

DEFERUNDA Distant

1906. *Majella* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* 1, **9**: 421. Haplotype, *Majella majella* Kirkaldy, ibid.: 421 (nom. praeocc.).

1912. *Deferunda* Distant, *Ann. Mag. nat. Hist.* (8) **9**: 186. Haplotype, *Deferunda stigmatica* Distant.

1914. *Okatropis* Matsumura, *Ann. hist.-nat. Mus. hung.* **12**: 272. Orthotype, *Okatropis rubrostigma* Matsumura, loc. cit.: 273.

1948. *Majellana* Metcalf, *Smith Coll. Gen. Cat. Hem.*, **4** (10): 63 (nom. nov. for *Majella* Kirkaldy).

Head with eyes a little narrower than pronotum. Vertex not declivous, longer in middle line than broad across base (1·4:1), produced before eyes for about half their length, median carina present only near base, disk markedly depressed, anterior margin carinate, acutely convex, lateral margins foliate, convex, diverging basad, posterior margin transverse; frons shallowly convex in profile, longer in middle line than broad (1·3:1), widest part wider than base (5:1), basal margin convex, median carina present only in distal half, lateral margins straight, strongly foliate obliquely in basal half, less so distally, diverging to below level of antennae thence incurved to suture, disk of frons depressed in basal third, or apparently so on account of deeply foliate margins; clypeus fully three-quarters length of frons, medially and laterally carinate, subapical segment of rostrum as long as apical, antennae subovate, not sunk in a depression, ocelli touching eyes, eyes excavate beneath, scarcely overlapping pronotum.

Pronotum moderately short, almost as long behind eyes as in middle line, anterior margin of disk convex-truncate, posterior margin concave in an angle of about 100°, median carina present, lateral carinae of disk straight, diverging basad, attaining hind margin, each 2·2 times as long as median carina, pronotum laterad of disk moderately inclined anteroventrally, ventral margin of lateral pronotal lobes markedly angulate and oblique; mesonotúm longer than vertex and pronotum combined; tricarinate; pro-tibiae shorter than pro-femora and trochanters, post-tibiae with a single spine basad of middle.

Tegmina three times as long as broad, costal margin scarcely convex, Sc+R fork apparently simple to nodal line, Cu1 fork level with union of claval veins, M forked level with node, Cu1 deeply convex distad of claval apex, six apical areoles distad of stigma; clavus terminating distad of middle.

Deferunda stigmatica Distant

(Fig. 69)

1912. *Deferunda stigmatica* Distant, loc. cit.: 186.

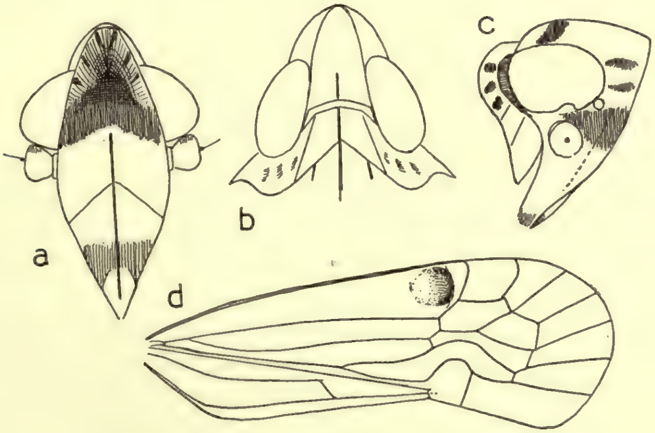

Fig. 69. *Deferunda stigmatica* Distant.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen.

The figures are of Distant's type. A topotype of *Majella majella* Kirk and a specimen of *Okatropis rubrostigma* Mats. have been compared with it and are unquestionably congeneric. The genus is readily distinguishable by the extreme foliation of the basal portion of the lateral carinae of the frons and by the tegminal venation.

KURANDELLA gen. n.

Head with eyes distinctly narrower than pronotum. Vertex not or scarcely declivous, broader across base than long in middle line (1·2:1), produced before eyes for about half their length, median carina distinct only in basal half, disk depressed, anterior margin carinate, convex in an angle of about 120°, lateral margins elevated, subfoliate, moderately diverging basad, posterior margin broadly concave; frons shallowly convex in profile, longer in middle line than broad (1·7:1), widest part wider than base (2·3:1), basal margin truncate or shallowly excavate, median carina distinct, percurrent, lateral margins convex, diverging to below level of antennae thence moderately incurved to suture, slightly foliate obliquely, disk of frons not depressed; clypeus short, about two-fifths length of frons, medially and laterally carinate, antennae subglobose, not sunk in a depression, ocelli very narrowly separated from eyes, eyes not excavate beneath, only slightly overlapping pronotum.

Pronotum distinctly short, about as long behind eyes as in middle line, anterior margin of disk convex, posterior margin rectangulately excavate, median carina present, lateral carina obscure or obsolete, pronotum laterad of disk not inclined anteroventrally except where overlapped by eyes, two carinae between eye and tegula, ventral margin of lateral pronotal lobes angulate and oblique; mesonotum longer than vertex and pronotum combined, tricarinate; pro-tibiae equal to profemora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina nearly three times as long as broad, costal margin slightly convex, Sc+R fork about level with Cu1 fork and union of claval veins, M forked level with stigma; clavus terminating distad of middle.

Type species, *Kurandella nigromaculata* sp. n.

Kurandella nigromaculata sp. n.

(Fig. 70)

Female: length, 3·8 mm.; tegmen, 5·0 mm.

Pale straw yellow; five spots on each lateral margin of frons, two spots above eyes, one below antennae, one above ocelli, one at apex of vertex, one at middle of each lateral margin, one in each depression of pronotum and on lateral lobes, six on disk of mesonotum, two on each tegula, piceous.

Tegmina stramineous; four spots in costal cell, one in first subapical cell, one in each of cells M1, M2, M3+4, and a regularly spaced series along all veins of corium fuscous-piceous.

Hind margin of pregenital plate transverse, slightly produced on each side of middle. Anal segment very short, apical margin convex, deeply notched medially. Subvaginal plate broad, weakly sclerotized in type specimen; ventral lobe of first valvulae with inner margin straight, directed caudad, outer margin oblique; third valvulae broadly ovate in lateral view, membrane on posterior margin broader dorsally than ventrally. Bursa copulatrix uniformly covered with minute annular ornamentation, and furnished with a single sub-placoid spine directed posteriorly; a semicircular plate with a spine at entrance to bursa.

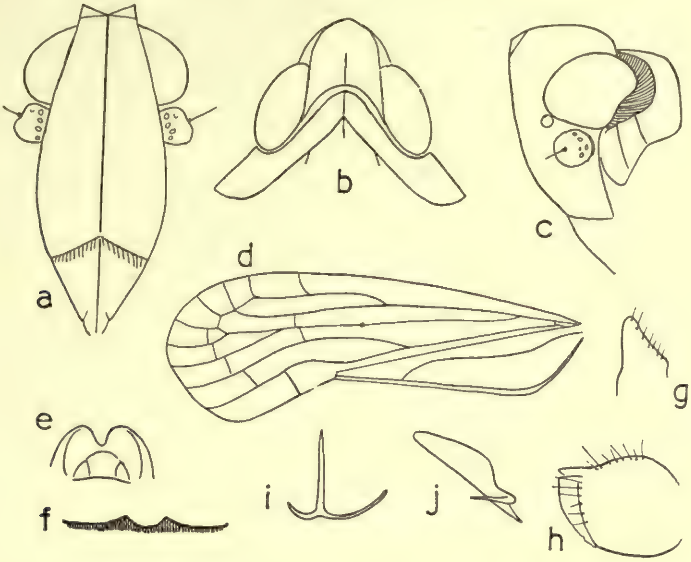

FIG. 70. *Kurandella nigromaculata*, gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, anal segment of female; *f*, posterior margin of pregenital sternite; *g*, ventral lobe of first valvula; *h*, third valvula, lateral view; *i*, *j*, lateral and ventral views of sclerite in bursa copulatrix.

Described from one female collected at Kuranda, Queensland, by F. P. Dodd (May 1904) Brit. Mus. 1948–549. *Kurandella* is distinguished by characters of the frons, vertex, and pronotum and by the tegminal venation. It is separated from *Betatropis* by the venation and from *Caristianus* by the shape of the pronotum.

CIONODERELLA gen. n.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, broader across base than long in middle line (1·5:1), not produced before eyes, median carina distinct in basal half only, disk moderately depressed, anterior margin carinate forming an angle of 140° at apex, lateral margins straight, diverging basad, posterior margin angulately excavate (135°); frons except near base almost straight in profile, or very shallowly convex, longer in middle line than broad (1·2:1), widest part wider than base (1·6:1), basal margin slightly excavate, median carina percurrent, lateral margins carinate, more or less straight and parallel between eyes then broadly ampliate to below antennae thence abruptly incurved to suture, not foliate laterad, disk of frons not depressed, clypeus about three-quarters length of frons in middle line, medially and laterally carinate, median carina most distinct in basal portion, rostrum with subapical joint equal to apical, distinctly surpassing post-trochanters, antennae subglobose, not sunk in a depression, ocelli not touching eyes, eyes not excavate beneath, not overlapping pronotum. Pronotum moderately short, as long behind eyes as in middle line, anterior margin of disk shallowly convex, posterior margin correspondingly concave (135°), median carina present, lateral carinae of disk straight, diverging basad, attaining hind margin, each 1·2 times as long as median carina, pronotum laterad of disk not inclined anteroventrally, two carinae between eye and tegula, ventral margin of lateral lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate; pro-tibiae at least as long as pro-femora and trochanters, post-tibiae apparently unarmed.

Tegmina 2·8 times as long as broad, Sc+R fork level with apex of clavus, M forked level with node, Cu1 fork scarcely distad of union of claval veins, nine or ten apical areoles distad of stigmal cell; clavus terminating basad of middle of tegmen.

Medioventral process of pygofer triangular, tapering distally.

Posterior margin of seventh sternite of female transverse. Bursa copulatrix furnished at entrance with a stout finger-like sclerite supported basally by a slender transverse strut.

Egg ellipsoidal with a short peg-like process at one pole.

Type species, *Cionoderella rubromarginata* sp. n.

Cionoderella rubromarginata sp. n.

(Fig. 71)

Male: length, 2·5 mm.; tegmen, 3·6 mm. Female: length, 2·7 mm.; tegmen, 3·9 mm.

Rufous, tinged red; apex of clypeus, rostrum and legs pallid stramineous, abdomen and genitalia fuscous. Tegmina fuscous; node, transverse veins, vein M, two spots in cell M, distal portion of Cu1 in corium, hyaline, remaining part of veins, stigma and Sc cell red. Wings smoky, veins reddish.

Medioventral process of pygofer triangular, sinuately tapering to apex. Phallobase in lateral view with dorsal margin horizontal, ventral margin sinuate with a shallow lobe in distal half.

Posterior margin of seventh sternite of female transverse. Ventral lobes of first valvulae of ovipositor tapering distally, with outer margin oblique; third valvulae in lateral view with dorsal margin straight, ventral margin convex: both these valvulae bearing setae with distinctly pustulate bases.

Described from four males and one female collected at Tena, Ecuador, by F. X. Williams (9 March 1923). The male holotype is in the British Museum (Natural History) Brit. Mus. 1932–279. *Cionoderella* is distinguished by the shape of the frons, vertex, and pronotum, by the tegminal venation, and by the armature of the bursa copulatrix.

SALEMINA Kirkaldy

1906. *Salemina* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1** (9):417, 424. Haplotype, *Salemina francescophila* Kirkaldy.

Head with eyes markedly narrower than pronotum. Vertex weakly declivous, broader across base than long in middle line (1·4:1), produced before eyes for about two-fifths of their length, median carina present except at apex, elevated, disk slightly depressed, anterior margin carinate, elevated, forming an angle of 90° at apex, lateral margins carinate, strongly diverging basad, posterior margin angulately excavate (110°); frons slightly convex in profile, longer in middle line than broad (about 1·6 : 1), lateral margins carinate, gradually divergent to below level of antennae, thence incurved, median carina present throughout; clypeus tricarinate, three-quarters of length of frons; rostrum with subapical joint apparently equal to apical, antennae subglobose, not sunk in a depression, eyes not overlapping pronotum. Pronotum moderately short, as long behind eyes as in middle line, anterior margin of disk truncate-convex, posterior margin broadly angulately excavate, median carina present, lateral carinae of disk straight or slightly convex, each about 1·6 times as long as median carina, attaining hind margin, pronotum laterad of disk not or scarcely inclined anteroventrally; mesonotum longer than vertex and pronotum combined; distinctly tricarinate; post-tibiae with a single spine basad of middle.

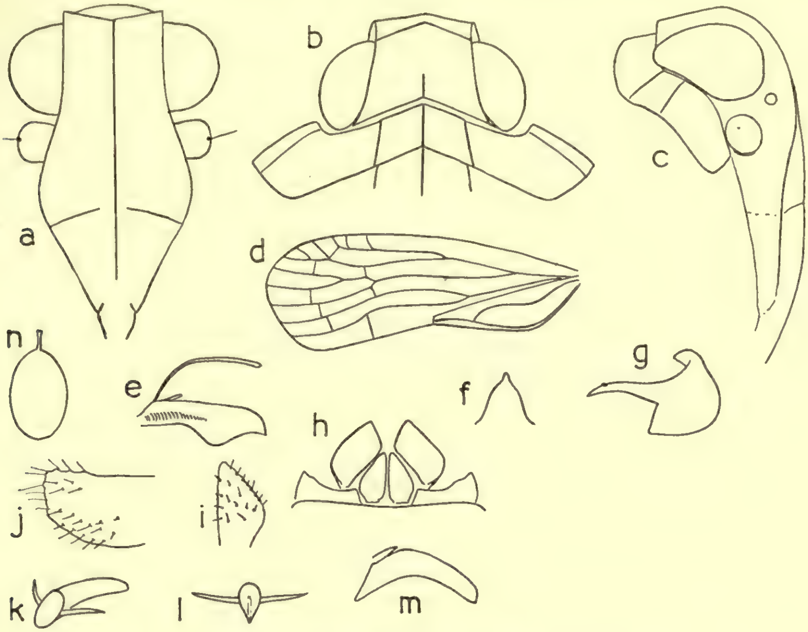

FIG. 71. *Cionoderella rubromarginata*, gen. et sp. n.

a, frons and clypeus; ***b***, vertex and pronotum; ***c***, head in profile; ***d***, tegmen; ***e***, aedeagus, lateral view; ***f***, medio-ventral process of pygofer; ***g***, genital style; ***h***, ventral view of female genitalia; ***i***, ventral lobe of first valvula of ovipositor; ***j***, third valvula, lateral view; ***k***, ***l***, ***m***, posterolateral, anterior, and lateral views of sclerite near entrance to bursa copulatrix; ***n***, egg.

Tegmina about three times as long as broad, anterior margin slightly convex, commissural margin forming a re-entrant angle of about 160° at apex of clavus, Sc+R fork about level with Cu1 fork, veins prominent, nine apical areoles distad of stigma, short, three in R and M scarcely longer than wide; clavus terminating at middle of tegmen.

Salemina francescophila Kirkaldy

(Fig. 72)

1906. *Salemina francescophila* Kirkaldy, loc. cit.: 424.

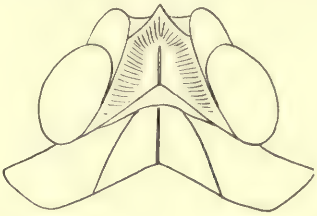

Fig. 72. *Salemina francescophila* Kirkaldy.
Vertex and pronotum.

The genus is known only from Queensland. Its affinities are uncertain, but would seem to lie with *Mahuna* Dist., from which it is separated by the proportions of the frons and pronotal disk. The tegminal venation, while not much dissimilar from that of *Mahuna*, would appear to be closest to that of *Hamba perplexa* Dist.

FRANCESCA Kirkaldy

1906. *Francesca* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1**, pl. 9: 417, 424. Haplotype, *Francesca saleminophila* Kirkaldy.

Head with eyes slightly narrower than pronotum. Vertex not declivous or scarcely so, as long in middle line as broad across base, produced before eyes for a third of their length, median carina present basally, obsolete distally, disk strongly depressed, markedly deepest at middle, anterior margin carinate, forming an angle of 110° at apex, lateral margins straight, moderately diverging basally, posterior margin angulately excavate (130°); frons shallowly convex in profile, longer in middle line than broad (1·4 : 1), widest part wider than base (2·3 : 1), basal margin sinuate, median carina percurrent, lateral margins straight to below level of antennae thence moderately incurved to suture, slightly foliate anteriorly, disk of frons not depressed; clypeus three-quarters of length of frons in middle line, medially and laterally carinate, antennae subglobose, not sunk in a depression, eyes slightly overlapping pronotum. Pronotum short, shorter behind eyes than in middle line, anterior margin of disk truncate, posterior margin rectangularly excavate, median carina present, lateral carinae of disk slightly concave, diverging basad, attaining hind margin, each about 2·3 times as long as median carina, pronotum laterad of disk only moderately inclined anteroventrally, four weak supernumerary carinae behind eyes, lateral margins carinate between eye and tegula, ventral margin of pronotal lobes oblique; mesonotum twice as long as pronotum and vertex combined, distinctly tricarinate; post-tibiae with a single spine basad of middle.

Tegmina three times as long as wide, costal margin slightly convex, sutural margin forming a re-entrant angle of about 150° at apex of clavus, Sc+R fork slightly distad of Cu1 fork, M forking at level of node, Cu1 fork about level with union of claval veins, nine apical areoles distad of stigma, the anterior five about as broad as long; clavus terminating distad of middle of tegmen.

Francesca saleminophila Kirkaldy

(Fig. 73)

1906. *Francesca saleminophila* Kirkaldy, loc. cit.: 424.
1907. Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **3**, pl. 9, figs. 18, 19.

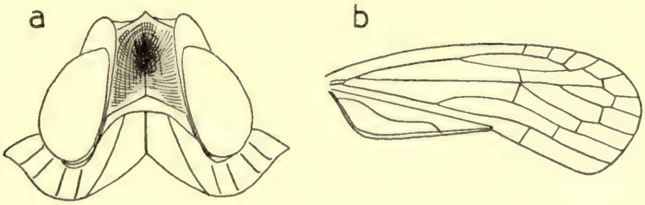

Fig. 73. *Francesca saleminophila* Kirkaldy.
a, vertex and pronotum; *b*, tegmen.

The genus is distinguished by the shape of the vertex and pronotum and by the tegminal venation: it is possible that its comparatively large size (6·0 mm. from vertex to apex of folded tegmina) is also characteristic of the genus. The present species is known only from Queensland.

MORABALLIA gen. n.

Head with eyes slightly narrower than pronotum. Vertex slightly declivous, as broad across base as long in middle line, produced before eyes for a quarter of their length, median carina absent, indicated at extreme base, disk markedly depressed, anterior margin carinate, elevated, sinuate, forming a general angle of 50°, lateral margins short, elevated, straight, diverging basad, posterior margin rectangularly excavate; frons slightly convex in profile, longer in middle line than broad (1·8:1), widest part wider than base (2·2:1), basal margin excavate, median carina elevated, percurrent, lateral margins carinate, foliate obliquely, straight to below level of antennae thence slightly incurved to suture, disk of frons distinctly longitudinally depressed between median carina and margins, less so distally; clypeus two-thirds of length of frons, medially and laterally carinate, rostrum with subapical segment very markedly shorter than apical, antennae subglobose, not sunk in a depression, ocelli separated from eyes, eyes a little overlapping pronotum. Pronotum short, anterior margin of disk convex, posterior margin angulately excavate (110°), median carina present, lateral carinae of disk straight or slightly convex, each about 1·2 times as long as median carina, attaining hind margin, pronotum laterad of disk moderately inclined anteroventrally, two weak incomplete carinae at lateral margin, ventral margin of lateral lobes convex, slightly oblique; mesonotum longer than vertex and pronotum combined, distinctly tricarinate, carinae diverging basad; pro-tibiae equal to pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 145° at apex of clavus, Sc+R fork level with Cu1 fork, both a little distad of union of claval veins, M forking level with node, eight apical areoles distad of stigmal cell; clavus terminating at middle of tegmen.

Bursa copulatrix armed with a finger-like sclerite with a broadly triangular base: a spine of similar shape also near entrance.

Type species, *Moraballia fuliginosa* sp. n.

Moraballia fuliginosa sp. n.

(FIG. 74)

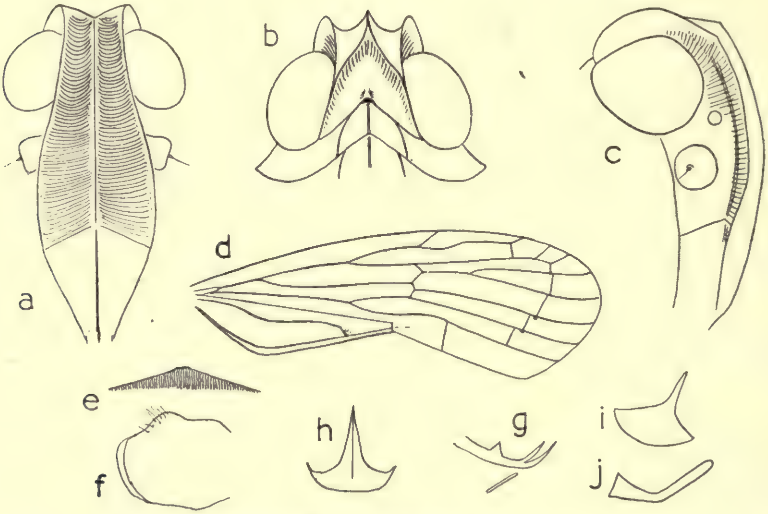

FIG. 74. *Moraballia fuliginosa*, gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, posterior margin of pregenital sternite of female; *f*, third valvula of ovipositor; *g*, apical portion of first valvula; *h*, sclerite in wall of vagina; *i*, *j*, dorsal and lateral views of sclerite in bursa copulatrix.

Female: length, 3·9 mm.; tegmen, 5·0 mm.

Fuscous-piceous; clypeus, lower part of thorax and legs fuscous. Tegmina fuscous-piceous, costal cell fuscous.

Hind margin of pregenital sternite transverse-convex. Ovipositor with first valvulae beset with two stout teeth at apex and a broadly triangular tooth nearer base; third valvulae broadly subovate, with a rounded setose eminence at middle of dorsal margin. Bursa copulatrix furnished with a straight finger-like spine dilated at its base into a crescentic lamina; a similar spine, more acute at apex and with a narrower base, in vagina.

Described from one female labelled 'Moraballi Creek, Essequibo River, British Guiana, 27.ix.1929; Brit. Mus. 1929–485'. Type in British Museum. This genus is distinguished by the shape of the frons, vertex, and pronotum and by the tegminal venation. The structure of the head recalls that of *Francesca*, but the shape of the pronotum and of the apical areoles is different in the two genera.

BATHYCEPHALA gen. n.

Head with eyes slightly narrower than pronotum. Vertex declivous, broader across base than long in middle line (1·6:1), produced before eyes for half their length, median carina absent, disk sunk below level of anterior margin to a depth about equal to half length of vertex, anterior margin carinate, foliate, transverse along its ventral margin, obtusely angulate at apex of dorsal margin (130°), lateral margins elevated, straight, subparallel, posterior margin angulately excavate (120°); frons slightly convex in profile, longer in middle line than broad (1·4:1), widest part wider than base (1·5:1), basal margin excavate, median carina elevated, percurrent, lateral margins carinate, foliate obliquely, straight to below level of antennae thence slightly incurved, disk of frons longitudinally impressed between median carina and margins; clypeus three-quarters of length of frons, medially and laterally carinate; rostrum with subapical segment equal to apical, antennae subglobose, not sunk in a depression, ocelli very narrowly separated from eyes, eyes scarcely excavated below, slightly overlapping pronotum. Pronotum short, not quite as long behind eyes as in middle line, anterior margin of disk truncate, posterior margin deeply concave, median carina present, lateral carinae of disk concave, each fully three times as long as median carina, not attaining hind margin, pronotum laterad of disk inclined anteroventrally except near hind margin, ventral margin of lateral lobes distinctly oblique; mesonotum longer than vertex and pronotum together, tricarinate; pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina 3·2 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of about 150° at apex of clavus, Sc+R fork slightly distad of Cu1 fork, M forking slightly basad of node, Cu1 fork about level with union of claval veins, five small cells in stigmal area, eight apical areoles around margin distad of these; clavus terminating distad of middle of tegmen.

Anal segment of female about as broad as long, telson just surpassing apical margin. Posterior margin of seventh sternite transverse-convex. Bursa copulatrix armed with a spinose sclerite; a similar sclerite at its entrance.

Egg ellipsoidal with a small peg-like micropylar process at one pole.

Type species, *Bathycephala guianesa* sp. n.

Bathycephala guianesa sp. n.

(FIG. 75)

Female: length, 4·8 mm.; tegmen, 6·3 mm.

Fuscous; clypeus at base and apex, lateral margins and base of frons, genae except before antennae, sides of head above ocelli and above eyes, carinae and hind margin of pronotum, carinae of mesonotum, a spot inside lateral mesonotal carinae at base, a spot at each lateral angle, apex of scutellum, rostrum, margins of pleurites, apex of post-femora and all post-tibiae, testaceous to pallid. Tegmina fuscous-piceous, costal cell, stigma, cell Sc+R, basal two-thirds of clavus, a broken band from node to apex of clavus extending into cell Cu1b, pallid or mostly so, veins testaceous, pallid in membrane, membrane infuscate, paler basad of transverse veins and apical margin.

Subvaginal plate broadly triangular, pigmented but not strongly sclerotized. Ventral lobes of first valvulae with inner margin straight, outer margin broadly curved. First valvulae of ovipositor with three broad teeth and two longer apical teeth. Bursa copulatrix furnished with a flattened spine arising from a crescentic sclerite; entrance to bursa armed with a similar spine, one-third longer than preceding and less flattened.

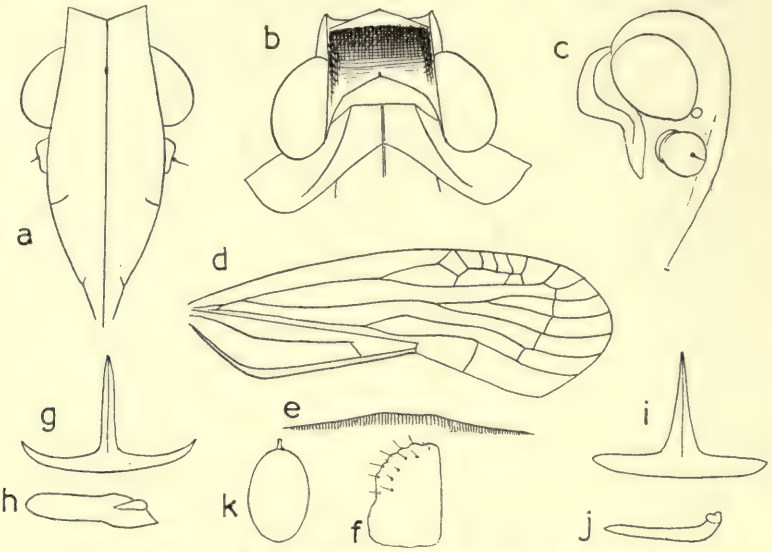

FIG. 75. *Bathycephala guianesa*, gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, posterior margin of pregenital sternite of female; *f*, ventral lobe of first valvula of ovipositor; *g*, *h*, dorsal and lateral views of sclerite in bursa copulatrix; *i*, *j*, dorsal and lateral views of sclerite in vagina; *k*, egg.

Described from one female taken at New River Head, British Guiana, 1,500–2,500 ft., by C. A. Hudson (27 April 1938), Brit. Mus. 1939–370. *Bathycephala* is distinguished by the shape of the vertex and pronotum and by the tegminal venation. It differs from *Moraballia* in the shape of the vertex and pronotum and in profile of head, as well as in the proportionate length of the clavus.

EPIRAMA Melichar

1903. *Epirama* Melichar, *Hom. Fauna Ceylon*:45. Haplotype, *E. conspergata* Melichar.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, longer in middle line than broad across base (1·3:1), produced before eyes for two-thirds of their length, median carina distinct throughout, disk slightly depressed, anterior margin carinate, acutely convex (through 70°), lateral margins straight, diverging basad, posterior margin shallowly excavate; frons longer in middle line than broad (1·7:1), widest part wider than base (2·7:1), basal margin convex, median carina distinct, percurrent, lateral margins carinate, weakly foliate laterally, straight to below level of antennae thence slightly incurved, disk of frons slightly impressed on each side of median carina; clypeus about three-quarters of length of frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, surpassing post-coxae, antennae subglobose, not sunk in a depression, ocelli not touching eyes, eyes not overlapping pronotum. Pronotum moderately short, not quite as long behind eyes as in middle line, anterior margin of disk convex, posterior margin angulately excavate (110°), median carina present, lateral carinae of disk convex, attaining hind margin, each about 1·2 times as long as median carina, pronotum laterad of disk not inclined anteroventrally or only slightly so, margins carinate between eye and tegula, ventral margin of lateral lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate; pro-tibiae equal to pro-femora with trochanters, post-tibiae unarmed or with a single spine basad of middle.

Tegmina 3·4 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of about 160° at apex of clavus, Sc+R fork about level with Cu1 fork, M forked at level of node, Cu1 fork about level with union of claval veins, eight apical areoles around margin distad of stigmal cell; clavus terminating distad of middle of tegmen.

Epirama conspergata Melichar

(Fig. 76)

1903. *Epirama conspergata* Melichar, loc. cit.: 45.

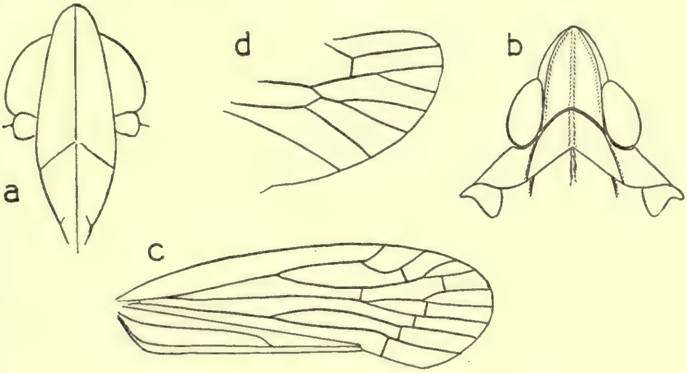

Fig. 76. *Epirama conspergata* Melichar.
a, frons and clypeus; *b*, vertex and pronotum; *c*, tegmen; *d*, apex of wing.

The figures are after Melichar.

Epirama appears to be close to *Betatropis* and *Caristianus*. The genera are apparently constantly separated by the carination of the vertex and the proportions of the tegmina. *Epirama* was described as having no post-tibial spine, while *Betatropis* was stated to have two. This difference is probably unreliable.

MAHUNA Distant

1907. *Mahuna* Distant, *Ann. Mag. nat. Hist.*: (7) **19**: 289. Orthotype, *Mahuna conspersa* Distant.
1928. *Tabiana* Jacobi, *Archiv för Zoologi*: **19A** No. 28: 28. Logotype, *Tabiana viridicans* Jacobi.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, broader across base than long in middle line (1·7:1), produced before eyes for three-eighths of their length, median carina present except at extreme apex, disk distinctly depressed, anterior margin carinate, forming an angle of 120° at apex, lateral margins carinate, straight, diverging basad, posterior margin excavate (about 130°), frons slightly convex in profile, longer in middle line than broad, widest part fully twice as wide as base, basal margin slightly excavate, median carina percurrent, lateral margins carinate, slightly foliate laterally, convex, diverging to below level of antennae thence incurved to suture, disk of frons not impressed; clypeus about two-thirds length of frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli separated from eyes, eyes not covering pronotum. Pronotum short, at least as long behind eyes as in middle line, anterior margin of disk convex-truncate, posterior margin angulately excavate (about 110°), median carina present, lateral carinae of disk convex, each three times as long as median carina, attaining hind margin, pronotum laterad of disk slightly inclined anteroventrally, ventral margins of lateral lobes oblique; mesonotum longer than vertex and pronotum together, tricarinate, pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 155° at apex of clavus, Sc+R fork almost level with Cu1 fork, both scarcely distad of union of claval veins, M forked level with node, nine apical areoles distad of stigmal cell; clavus terminating distad of middle of tegmen. Wings with R two-branched, M two-branched, Cu1 three-branched.

Mahuna conspersa Distant

(FIG. 77)

1907. *Mahuna conspersa* Distant, loc. cit.: 290.

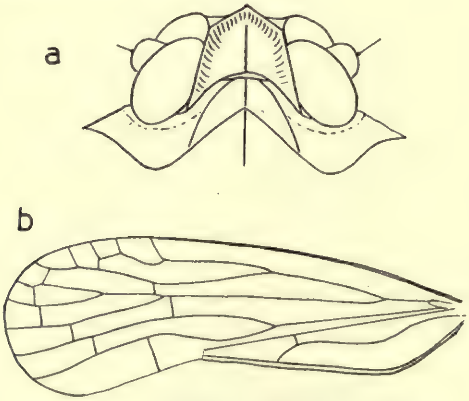

FIG. 77. *Mahuna conspersa* Distant.
a, vertex and pronotum; *b*, tegmen.

The figures are of Distant's type. *Mahuna* is distinguished by the shape of the vertex and pronotum and by the tegminal venation; it differs from *Salemina* Kirk.

in the shape of the pronotal disk and in the proportions of the apical areolets of the tegmen.

MLANJELLA gen. n.

Head with eyes slightly narrower than pronotum. Vertex not declivous, broader across base than long in middle line (2:1), produced before eyes for scarcely a fifth of their length, median carina present only in basal half, disk depressed, anterior margin carinate, forming an angle of 155° at apex, lateral margins carinate, straight, diverging basad, posterior margin subangulately excavate (110°); frons slightly convex in profile, longer in middle line than broad (1·5:1), widest part wider than base (1·8:1), basal margin truncate, median carina percurrent, rather calloused in basal fifth, lateral margins carinate, slightly foliate laterad, convex, diverging to below level of antennae thence slightly incurved to suture, disk of frons not impressed; clypeus two-thirds of length of frons, medially and laterally carinate, rostrum with subapical segment equal to apical, just attaining post-coxae, antennae subglobose, slightly sunk in a depression, ocelli touching eyes, eyes slightly covering pronotum. Pronotum short, not as long behind eyes as in middle line, anterior margin of disk convex-truncate, posterior margin angulately excavate (about 100°), median carina present, lateral carinae of disk slightly convex, each three times as long as median carina, attaining hind margin, pronotum laterad of disk distinctly inclined anteroventrally, ventral margins of lateral lobes oblique; mesonotum longer than vertex and pronotum together, tricarinate, pro-tibiae equal to pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina fully three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 150° at apex of clavus, Sc+R fork about level with Cu1 fork, or slightly distad, M fork slightly basad of node, Cu1 fork about level with union of claval veins, stigmal area with about four small cells, eight areoles distad of these around apical margin; clavus terminating distad of middle of tegmen. Wings with R two-branched, M two-branched, Cu1 three-branched.

Bursa copulatrix unarmed, two large spines at its entrance, each attached to a crescentic plate in the wall.

Type species, *Mlanjella bispinosa* sp. n.

Mlanjella bispinosa sp. n.

(FIG. 78)

Female: length, 3·5 mm.; tegmen, 5·0 mm.

Posterior margin of vertex raised in a slight ridge, median carina rather broad.

Fuscous: two bands across frons and genae, carinae of pronotum and mesonotum, hind margin of pronotum, lower third of tegulae, lower part of thorax and margins of abdomen ochraceous, legs pale fuscous. Tegmina fuscous, two transparent oval spots in costal cell, one at stigma, all transverse veinlets and apex of clavus pallid. Wings infuscate.

Posterior margin of seventh abdominal sternite transverse. Subvaginal plate with dorsal margin about half length of ventral margin. Outer margin of ventral lobes of first valvulae oblique, broadly rounding into apical margin; first valvulae armed with six teeth, the basal three short. Third valvulae subquadrate with an eminence on dorsal margin. Bursa copulatrix unarmed; two unequal spines opposed to one another at entrance to bursa, each rising from a crescentic sclerite.

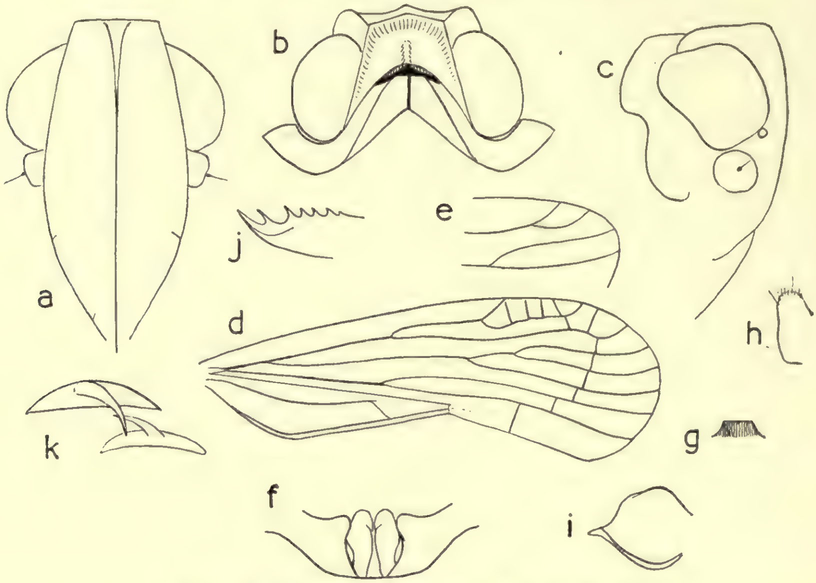

Fig. 78. *Mlanjella bispinosa*, gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of wing; *f*, posterior margin of seventh sternite, lateroventral portions of eighth, and ventral lobes of first valvulae of ovipositor; *g*, subvaginal plate; *h*, ventral lobe of first valvula; *i*, third valvula; *j*, first valvula; *k*, spiniferous sclerites at entrance to bursa copulatrix.

Described from one female collected at Mt. Mlanje, Nyasaland, by S. A. Neave (6 July 1913), Brit. Mus. 1913–140. Type in British Museum.

Mlanjella is distinguished by the shape of the frons, vertex, and pronotum and by the tegminal venation.

HAITIANA Dozier

1936. *Haitiana* Dozier, *Amer. Mus. Novit.* **845**:2. Orthotype, *Haitiana nigrita* Dozier.

Head with eyes only a little narrower than pronotum. Vertex not or scarcely declivous, broader across base than long in middle line (about 2:1), not produced before eyes, medially carinate throughout, disk not depressed, anterior margin carinate, convex, a transverse callus between apex of vertex and frons, and a transverse carina on each side near anterior margin of eyes, parallel to anterior margin of vertex, lateral margins weakly carinate, concave, diverging basad, posterior margin broadly excavate; frons slightly convex in profile, broader than long in middle line (1·1:1), widest part wider than base (nearly 1·3:1), basal margin truncate, median carina percurrent, lateral margins carinate, not foliate, straight or slightly convex to below level of antennae, thence abruptly incurved to suture, disk of frons not impressed;

clypeus about as long as frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae cylindrical, obliquely truncate distally, sunk in a depression and roofed by eyes, ocelli touching eyes, eyes not or only slightly overlapping pronotum. Pronotum short, as long behind eyes as in middle line, anterior margin of disk convex, posterior margin angulately excavate (about 130°), disk small, medially carinate, with lateral carinae convex, each fully twice as long as median carina, attaining hind margin, pronotum laterad of disk not inclined anteroventrally, with four supernumerary carinae on each side behind eyes but no carina between eyes and tegulae at lateral margins, ventral margins of lateral lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate, pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a slight spine basad of middle.

Tegmina about 2·8 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 145° at apex of clavus, Sc+R fork nearly level with Cu1 fork, M forked level with node, Cu1 fork distad of union of claval veins but basad of apex of clavus, R, M and Cu1a approximated at nodal line, Cu1b distinctly convex distad of apex of clavus, Cu1 and first claval vein each foliate near middle, second claval vein foliate near apex, seven areoles along apical margin distad of stigmal cell. Wings with R simple, M two-branched.

Haitiana nigrita Dozier

(Fig. 79)

1936. *Haitiana nigrita* Dozier, loc. cit.: 2.

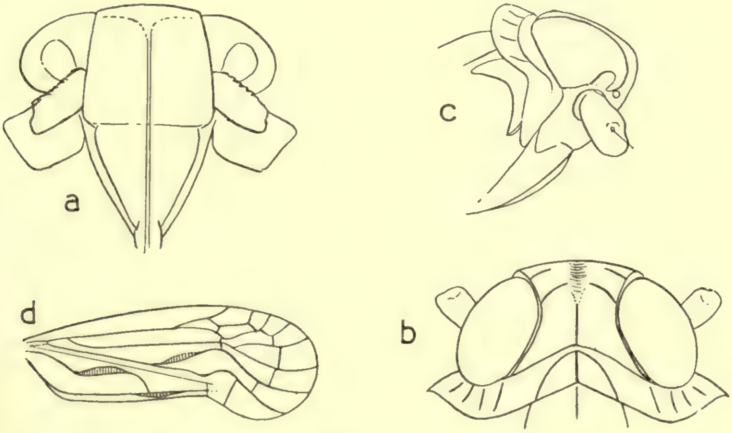

Fig. 79. *Haitiana nigrita* Dozier
a, frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen.

The figures of the head are from the holotype in the American Museum of Natural History, while that of the tegmen is from a specimen in the British Museum. The genus is well distinguished by the characters of the head and pronotum and by the tegminal venation. The structure of the anterior portion of the vertex recalls that found in *Eurynomeus*, while the tegmina are not dissimilar from those of *Tropiphlepsia*.

EURYNOMEUS Kirkaldy

1906. *Eurynomeus* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1** (9):417, 422. Haplotype, *Eurynomeus australiae* Kirkaldy, loc. cit.:422.

Head with eyes narrower than pronotum. Vertex not declivous, broader across base than longer in middle line (1·4:1), produced before eyes for about a fifth of their length, median carina present except at extreme apex, disk slightly depressed, anterior margin carinate, strongly convex, a more or less distinct carina on each side at level of anterior margin of eyes parallel to anterior margin of vertex, forming, except for a medial interruption, two carinae between vertex and frons, lateral margins straight, diverging basad, posterior margin angulately excavate (about 120°), frons moderately convex in profile, about as broad as long in middle line, widest part wider than base (1·6:1), basal margin truncate, median carina percurrent, lateral margins carinate, foliate laterad distally, convex, diverging to below level of antennae thence incurved to suture, disk of frons not impressed; clypeus about four-fifths of length of frons, medially and laterally carinate, rostrum with subapical segment about equal to apical, antennae subglobose, slightly sunken, ocelli touching eyes, eyes not or scarcely overlapping pronotum. Pronotum short, as long behind eyes as in middle line, anterior margin of disk convex-truncate, posterior margin angulately excavate (115°), median carina present, an impression on disk on each side, lateral carinae of disk straight, each about twice as long as median carina, attaining hind margin, pronotum laterad of disk not or scarcely inclined anteroventrally, ventral margin of lateral lobes oblique; mesonotum longer than vertex and pronotum together, tricarinate, pro-tibiae slightly longer than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina fully three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 155° at apex of clavus, Sc+R fork about level with Cu1 fork, both scarcely distad of union of claval veins, M forking at level of node, nine apical areoles distad of stigmal cell; clavus terminating distad of middle of tegmen. Wings with R two-branched, M two-branched, Cu1 three-branched.

Eurynomeus granulatus Muir

(Fig. 80)

1921. *Eurynomeus granulatus* Muir, *Proc. Hawaii. ent. Soc.* **4**:571.

For comparison with Kirkaldy's type (Kirkaldy, 1907, pl. 9, figs. 7, 8) figures are given of the type of *E. granulatus* Muir. A third species, *E. niger* Muir, was also seen, and it would appear that the characters given above are truly generic. The genus is readily distinguished by the shape of the frons, vertex, and pronotum, by the interrupted double carinae at the anterior margin of the vertex (though the anterior portions may be evanescent), and by the tegminal venation. All the known species are Australasian.

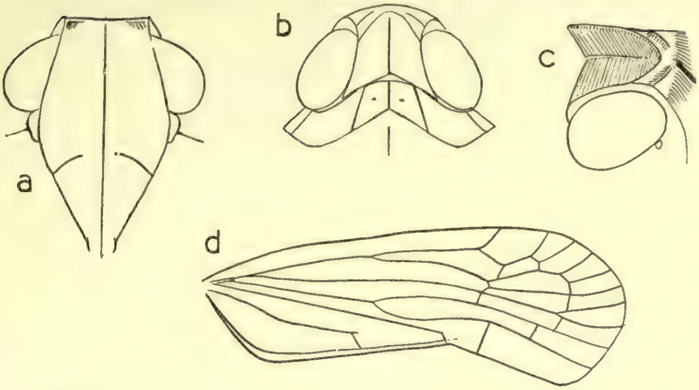

Fig. 80. *Eurynomeus granulatus* Muir
a, frons and clypeus; *b*, vertex and pronotum; *c*, vertex and base of frons, laterodorsal view; *d*, tegmen.

PSEUDHELICOPTERA Fowler

1904. *Pseudhelicoptera* Fowler, *Biol. Cent.-Amer. Rhynch.-Hom.* **1**:103, 107. Haplotype, *Pseudhelicoptera nasuta* Fowler.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, markedly convex in profile, longer in middle line than broad across base (about 3:1), produced before eyes for nearly two-thirds of their length, median carina present only in basal third, disk much hollowed out, a small triangular areolet at each latero-apical angle of head, lateral margins strongly foliate, much raised above anterodorsal margin of eyes, straight, parallel or slightly diverging between eyes, posterior margin acutely excavate, frons in profile almost straight, longer in middle line than broad (about 3:1), widest part about three times width at base, basal margin acutely convex, median carina percurrent, lateral margins carinate, gradually diverging to below level of antennae thence slightly incurved to suture, disk not impressed; clypeus about half of length of frons, medially and laterally carinate, antennae subglobose, slightly sunk in a depression, ocelli separated from eyes, eyes broadly ovate, not excavate, not or only slightly overlapping pronotum. Pronotum very short medially, of moderate length behind eyes, disk sublinear, tectiform, anteriorly acute, posteriorly rectangularly excavate, medial notch acute, median carina prominent, pronotum laterad of disk not inclined anteroventrally, three supernumerary carinae behind each eye and two at margin between eye and tegula, ventral margins of lateral lobes oblique; mesonotum about equal to vertex and pronotum combined, tricarinate, post-tibiae with a single spine basad of middle.

Tegmina three times as long as wide, costal margin slightly convex, sutural margin forming a re-entrant angle of about 155° at apex of clavus, a narrow costal area present, Sc+R fork slightly basad of Cu1 fork, or at same level, M forked at level of node, Cu1 fork very approximately level with union of claval veins, numerous supernumerary veinlets along costal margin, about 9 in Sc and R at margin distad of stigmal cell, apical areoles of Cu normal; clavus terminating distad of middle of tegmen. Wing venation normal.

Medioventral process of pygofer subconical, raised in a small dome apically.

Pseudhelicoptera nasuta Fowler

(FIG. 81)

1904. *Pseudhelicoptera nasuta* Fowler, loc. cit.: 108, p. 11, figs. 18, *a, b*.

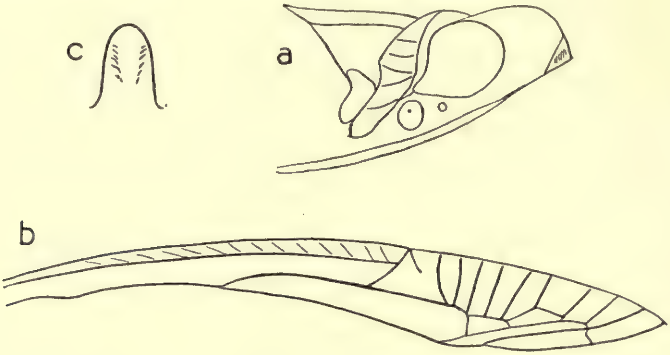

FIG. 81. *Pseudhelicoptera nasuta* Fowler

a, **head and thorax lateral view;** ***b***, **anterior margin of tegmen;** ***c***, **medioventra process of pygofer.**

The figures are of Fowler's male holotype from Volcán de Chiriquí. A female from New River, British Guiana (C. A. Hudson, 26 February 1938), is larger than the preceding, being 6·9 mm. long with a tegminal length of 7·2 mm. The coloration is similar but generally darker. In the tegmina Cu1a is forked at the level of the apical line of transverse veins, while in the type it is simple to the apex. The genus is readily distinguished by the shape of the head, pronotum, and tegminal venation, and occupies a rather isolated position in its group.

REMOSACHILUS gen. n.

Head with eyes slightly narrower than pronotum. Vertex not declivous, longer in middle line than broad across base (3:1), produced before eyes for twice their length, median carina distinct in basal third, obsolete in distal two-thirds, disk slightly depressed, anterior margin carinate, shallowly convex, a small triangular areolet at each latero-apical angle of head, lateral margins carinate, foliate, straight or slightly sinuate, diverging basad, posterior margin rectangulately excavate, frons slightly concave in profile, longer in middle line than broad (3·3:1), widest part about three times as wide as width at base, basal margin convex, median carina percurrent, lateral margins carinate and slightly foliate anteriorly, sinuately diverging to below level of antennae thence gently incurved to suture, disk not impressed, clypeus about a third of length of frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, separated from eyes, eyes elongate-oval, not excavate, not overlapping pronotum. Pronotum moderately long, not quite as long behind eyes as in middle line, anterior margin of disk semicircularly convex, posterior margin acutely excavate, median carina present, lateral carinae of disk straight, each about 1·1 times as long as median carina, attaining hind margin, pronotum laterad of disk not inclined anteroventrally, two faint supernumerary carinae behind eyes, two carinae on each side between eye and tegula, ventral margins of lateral lobes oblique; mesonotum shorter than vertex and pronotum combined, tricarinate, pro-tibiae about equal to pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina a little more than three times as long as wide, costal margin slightly convex, sutural margin forming a re-entrant angle of 155° at apex of clavus, Sc+R forked level with Cu1 fork or slightly distad, M fork about level with node, Cu1 fork distad of union of claval veins but markedly basad of apex of clavus, stigmal cell simple, eight areoles distad of it around apical margin, clavus terminating distad of middle of tegmen.

Type species, *Remosachilus macrocephalus* sp. n.

Remosachilus macrocephalus sp. n.

(FIG. 82)

Male and female: length, 5·0 mm.; length of head in middle line, 1·5 mm.; tegmen, 5·3 mm.

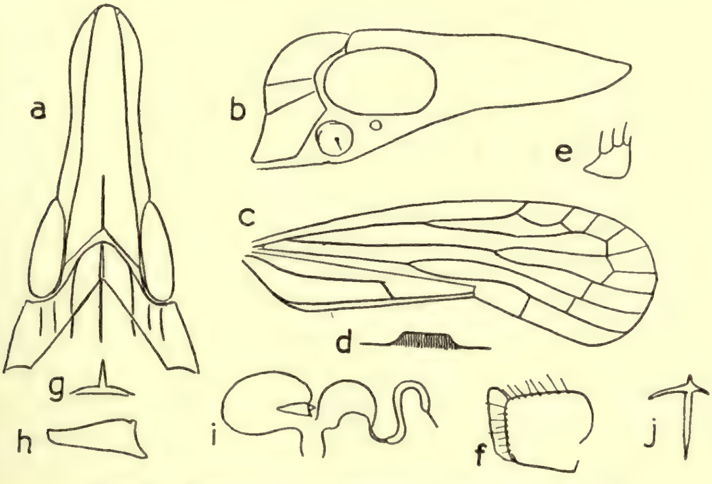

FIG. 82. *Remosachilus macrocephalus*, gen. et sp. n.

a, vertex and pronotum; *b*, head and pronotum in profile; *c*, tegmen; *d*, median portion of margin of pregenital sternite; *e*, ventral lobe of first valvula of ovipositor; *f*, third valvula of ovipositor; *g*, subvaginal plate, posterior view; *h*, *j*, lateral and dorsal views of sclerite in bursa copulatrix; *i*, bursa copulatrix and spermatheca (semi-diagrammatic).

Fuscous, speckled with round pallid-yellow spots; lateral margins of frons with three pallid wedges in basal half, pale testaceous in distal half with five oblique fuscous lines, abdomen fuscous. Tegmina infuscate, speckled with yellow in costal cell, near veins and on clavus, apical margin, from node to Cu, red. Wings infuscate.

Posterior margin of seventh abdominal sternite of female transverse, slightly convex-truncate in middle. Subvaginal plate with a median spine. Ventral lobes of first valvulae triangular, distinctly broader than long, third valvulae subquadrate, as broad at base as long, membrane on distal margin prominent. Bursa copulatrix unarmed, a large flattened sclerotized plate at entrance bearing a short spine.

Described from one male and two females labelled 'Sabron, Camp 2, 2000 ft., Cyclops Mts., Dutch New Guinea, vi. 1936, L. E. Cheesman, B.M. 1936–271.' Type in British Museum. The genus is distinguished by the shape of the head and pronotum and by the tegminal venation.

HAMBA Distant

1907. *Hamba* Distant, *Ann. Mag. nat. Hist.* (7) **19**:279. Orthotype, *Cixius perplexus* Walker.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, longer in middle line than broad across base (1·2:1), produced before eyes for two-fifths of their length, median carina distinct in basal half, obsolete distally, disk markedly depressed, anterior margin carinate, rectangulately convex at apex, a small triangular areolet at each latero-apical angle of head, its lower margin rather indistinct, lateral margins carinate, foliate dorsad, straight, gradually diverging basad, posterior margin rectangulately excavate with a distinct median notch; frons slightly convex in profile, longer in middle line than broad, widest part wider than base (about 2·5:1), basal margin truncate, median carina very prominent, percurrent, lateral margins carinate, straight or slightly convex to below level of antennae thence incurved to suture, disk not impressed; clypeus about two-thirds of length of frons, laterally carinate, median carina prominent, rostrum with subapical segment shorter than apical (1·6:1), antennae subglobose, not sunk in a depression, ocelli touching eyes or very narrowly separated from them, eyes scarcely overlapping pronotum. Pronotum short, about two-thirds as long behind eyes as in middle line, anterior margin of disk truncate, posterior margin angulately excavate (110°), median carina broad and distinct, lateral carinae of disk concave, each about twice as long as median carina, attaining hind margin, pronotum laterad of disk slightly inclined anteroventrally, an indication of three supernumerary carinae behind eyes or none, lateral margin carinate between eye and tegula, ventral margins of lateral lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, pro-tibiae slightly longer than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina nearly 3·2 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of about 158° at apex of clavus, Sc+R fork slightly distad of Cu1 fork, M fork slightly basad of level of node, Cu1 fork just distad of union of claval veins, nine areoles on apical margin distad of stigmal cell, all except Cu1b rather short; clavus terminating distad of middle of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Hamba perplexa (Walker)

(FIG. 83)

1857. *Cixius perplexus* Walker, *J. Linn. Soc. Lond.* (*Zool.*) **1**:147.

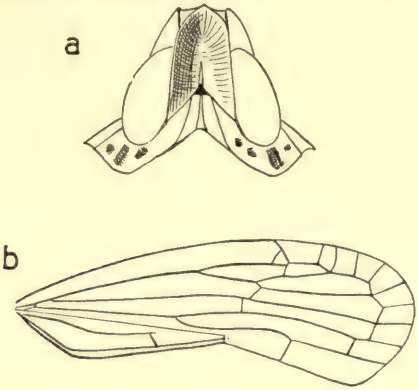

FIG. 83. *Hamba perplexa* (Walker)
a, vertex and pronotum; *b*, tegmen.

The figures are of the type. The genus is distinguished by the shape of the head and pronotum and by the tegminal venation. It is known only from Borneo, and is separated from *Betatropis* by the presence of latero-apical facets on the vertex and by the short apical areoles in the tegmen, as well as by the shape of the pronotal disk.

TALOKA Distant

1907. *Taloka* Distant *Ann. Mag. nat. Hist.* (7) **19**:280. Orthotype, *Brixia opaca* Walker.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, broader across base than long in middle line (1·5:1), produced before eyes for a third of their length, median carina distinct, disk not depressed, anterior margin carinate, rectangulately convex at apex, a relatively large and conspicuous triangular areolet at each latero-apical angle of head, lateral margins carinate, diverging basad, posterior margin broadly concave; frons slightly convex in profile, broader than long in middle line (nearly 1·2:1), widest part wider than base (1·6:1), basal margin slightly convex, median carina percurrent, slightly calloused at base, lateral margins carinate, slightly foliate laterad, straight or slightly convex to below level of antennae, thence rather strongly incurved to suture; clypeus as long as frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression but distinctly roofed over by eyes, ocelli touching eyes, eyes markedly excavate beneath, not overlapping pronotum. Pronotum moderately long, not quite as long behind eyes as in middle line, anterior margin of disk convex-truncate, posterior margin angulately excavate (120°), median carina distinct, lateral carinae straight, each about 1·5 times as long as median carina, attaining hind margin, pronotum laterad of disk not inclined anteroventrally, two or three supernumerary carinae weakly present behind eyes, two carinae between eye and tegula on each side, ventral margin of lateral lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate, pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina about 2·7 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 150° at apex of clavus, Sc+R fork distad of Cu1 fork, M fork at level of node, Cu1 fork level with union of claval veins, Cu1a and M approximated at nodal line, Cu1b strongly convex distad of apex of clavus, seven areoles distad of stigmal cell around apical margin; clavus terminating distad of middle of tegmen.

Taloka opaca (Walker)

(FIG. 84)

1867. *Brixia opaca* Walker, *J. Linn. Soc. Lond.* (*Zool.*) **10**: 111.

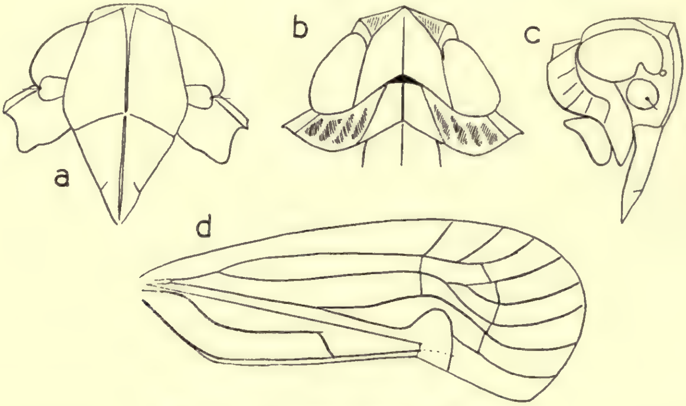

FIG. 84. *Taloka opaca* (Walker)
a, frons and clypeus; *b*, vertex and pronotum; *c*, head and pronotum in profile; *d*, tegmen.

The figures are of the type. *Taloka*, known only from New Guinea, is distinguished by the shape of the head and pronotum and by the tegminal venation. It is separated from *Gordiacea* by the form of the vertex, the ratio of lengths of the distal segments of the rostrum, and by the general proportions of the tegmina. In *Gordiacea*, moreover, the frons in profile is distinctly more convex, while the disk of the clypeus is slightly tumid, whereas in *Taloka* it is flat. The two genera are nevertheless very closely allied.

GORDIACEA Metcalf

1903. *Gordia* Melichar, *Hom. Fauna Ceylon*: 43. Haplotype, *Gordia oculata* Melichar (nom. praeocc.).

1948. *Gordiacea* Metcalf, *Smith Coll. Gen. Cat. Hem.* **4** (10): 17.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, broader across base than long in middle line (nearly 1·2 : 1), produced before eyes for a seventh of their length, median carina distinct, disk slightly depressed, anterior margin carinate, truncate at apex, a rather small equilaterally-triangular areolet at each latero-apical aglen of head, lateral margins carinate, moderately diverging basad, posterior margin truncate or very shallowly concave; frons distinctly convex in profile, as broad as long in middle line or very slightly broader than long (less than 1·1:1), widest part twice as wide as base, basal margin truncate, median carina present, prominent at base, obsolete at apex, lateral margins carinate, distinctly foliate laterad, sinuately diverging to below level of antennae thence moderately incurved to suture, disk of frons slightly hollowed out; clypeus slightly shorter than frons, medially and laterally carinate, disk slightly convex, rostrum with subapical segment longer than apical, reaching mesotrochanters, antennae subglobose, not sunk in a depression but distinctly roofed over by eyes, ocelli touching eyes, eyes markedly excavate beneath, not overlapping pronotum. Pronotum moderately long, not as long behind eyes as in middle line, anterior margin of disk convex-truncate, posterior margin angulately excavate (130°), median carina distinct, lateral carinae straight, each about 1·5 times as long as median carina, attaining hind margin, pronotum laterad of disk not inclined anteroventrally, three supernumerary carinae on each side behind eyes, two carinae between eye and tegula on each margin, ventral margin of lateral pronotal lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate, pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina 2·9 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 158° at apex of clavus, Sc+R fork basad of Cu1 fork, M forked at level of node, Cu1 fork level with union of claval veins, Cu1 and M approximated at level of nodal line, Cu1b strongly convex distad of apex of clavus, six marginal areoles distad of stigmal cell; clavus terminating distad of middle of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Gordiacea oculata (Melichar)

(FIG. 85)

1903. *Gordia oculata* Melichar, loc. cit.: 43.

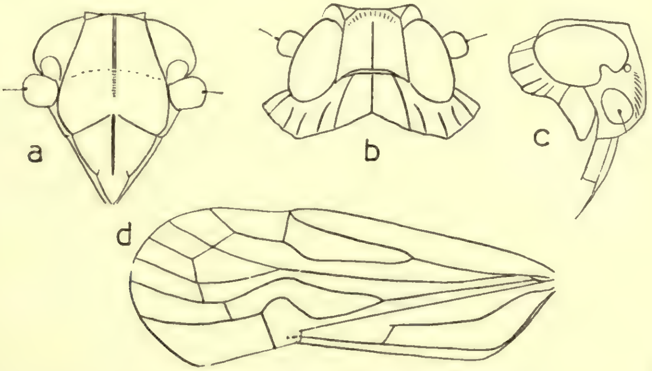

FIG. 85. *Gordiacea oculata* (Melichar)
a, frons and clypeus; *b*, vertex and pronotum; *c*, head and pronotum in profile; *d*, tegmen.

The figures are of a specimen in the British Museum. The genus is known only from Ceylon.

CYTHNA Kirkaldy

1906. *Cythna* Kirkaldy, *Bull. Hawaii. Sug. Pl. Ass. ent. Ser.* **1** (9):423. Haplotype, *Cythna laon* Kirkaldy, loc. cit.:423.

Head with eyes distinctly narrower than pronotum. Vertex very slightly declivous, broader across base than long in middle line (nearly 1·3:1), produced before eyes for rather more than a quarter of their length, median carina distinct, disk not or only slightly depressed, anterior margin carinate, subrectangulately convex at apex, a relatively large and conspicuous triangular areolet at each latero-apical angle of head, lateral margins carinate, diverging basad, posterior margin broadly concave; frons slightly convex in profile, longer in middle line than broad (1·1:1), widest part wider than base (2:1), basal margin truncate or slightly excavate, median carina percurrent, lateral margins carinate, slightly foliate laterad distally, straight to below level of antennae thence markedly incurved to suture; clypeus scarcely shorter than frons in middle line, medially and laterally carinate, rostrum with subapical segment equal to apical, antennae subglobose, slightly sunk in a depression, ocelli touching eyes, eyes not excavate, not overlapping pronotum. Pronotum moderately long, as long behind eyes as in middle line or slightly longer, anterior margin of disk convex-truncate, posterior margin angulately excavate (125°), median carina distinct, lateral carinae convex, each twice as long as median carina, attaining hind margin, pronotum laterad of disk not or scarcely inclined anteroventrally, two carinae between eye and tegula on each side, ventral margin of lateral lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate, pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina about 2·8 times as long as broad, granulate, costal margin slightly convex, sutural margin forming a re-entrant angle of 145° at apex of clavus, Sc+R fork level with Cu1 fork or slightly distad, M fork just basad of level of node, Cu1 fork level with union of claval veins, eight or nine areoles around margin distad of stigmal cell; clavus terminating at middle of tegmen. Wings with R two-branched, M two-branched, Cu1 three-branched.

Cythna fusca Muir

(Fig. 86)

1927. *Cythna fusca* Muir, *Ins. Samoa,* **2** (1):18.

The figures are from Muir's type in the British Museum. The genus is near *Argeleusa* Kirkaldy as noted by Kirkaldy himself, but differs in the shape of the vertex. Its species, *laon* Kirkaldy and *fusca* Muir, are both Australasian.

BALLOMARIUS Jacobi

1941. *Ballomarius* Jacobi, *Zool. Jb.* **74**:294. Orthotype, *Ballomarius terrenus* Jacobi, loc. cit. 295.

Head with eyes distinctly narrower than pronotum. Vertex slightly declivous, broader across base than long in middle line (1·4:1), produced before eyes for about a fifth of their length, median carina distinct, disk slightly depressed between median carina and margins, anterior margin carinate, convex, a small triangular areolet at each latero-apical angle of head, lateral margins carinate, slightly diverging basad, posterior margin truncate; frons slightly convex in profile, longer in middle line than broad (2·0 to 1·5:1), widest part wider than base (about 1·6:1), basal margin subtruncate, median carina percurrent, lateral margins carinate, slightly foliate obliquely distally, straight to below level of antennae thence incurved to suture; clypeus three-quarters length of frons, medially and laterally carinate, rostrum with subapical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli separated from eyes, eyes shallowly excavate beneath, slightly overlapping pronotum. Pronotum moderately short, not quite as long behind eyes as in middle line, anterior margin of disk truncate, posterior margin angulately excavate (120°), median carina distinct, lateral carinae of disk straight, each twice as long as median carina, attaining hind margin, pronotum laterad of disk moderately inclined anteroventrally, margins not carinate, ventral margin of lateral pronotal lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, pro-tibiae slightly longer than pro-femora with trochanters, or of equal length, post-tibiae with a single spine basad of middle.

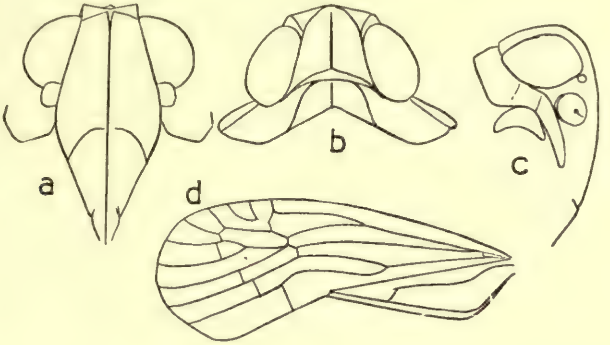

FIG. 86. *Cythna fusca* Muir
a, frons and clypeus; *b*, vertex and pronotum; *c*, head and pronotum in profile; *d*, tegmen.

Tegmina about 2·8 times as long as broad, costal margin slightly convex, sutural margin forming re-entrant angle of 150° at apex of clavus, Sc+R fork nearly level with Cu1 fork, M fork distinctly basad of level of node, on a line between node and apex of clavus, Cu1 fork level with union of claval veins, eight or nine areoles around apical margin distad of stigmal cell; clavus terminating not much distad of basal third of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Ballomarius bilobatus sp. n.

(FIGS. 87, 88)

Female: length, 3·5 mm.; tegmen, 5·8 mm.

Testaceous; a spot below antennae piceous, a broad longitudinal line on each side of median carina of vertex, pronotum and mesonotum fuscous; lateral fields of mesonotum, abdomen, except at posterior margins, reddish-brown; legs slightly infuscate. Tegmina fuscous, translucent, all veins testaceous; wings transparent, slightly infumed. Posterior margin of seventh abdominate sternite produced posteriorly in a narrow lobe on each side of middle line; ventral lobes of eighth abdominal segment sinuately tapering distally, terminating in a point. Third valvulae of ovipositor distinctly longer than broad, ventral margin straight or slightly convex, dorsal margin strongly convex, apical margin truncate-convex. Bursa copulatrix unornamented, vagina broadly tubular, a single spine, blunt at apex, on left side at entrance to bursa, attached basally to an oval sclerite with two horizontal rod-like appendages.

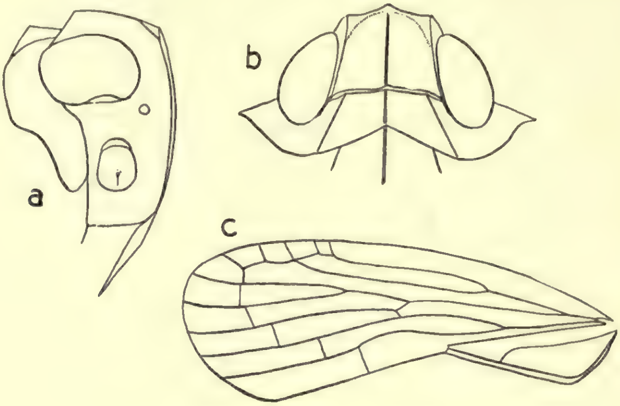

FIG. 87. *Ballomarius bilobatus* sp. n.
a, head in profile; *b*, vertex and pronotum; *c*, tegmen.

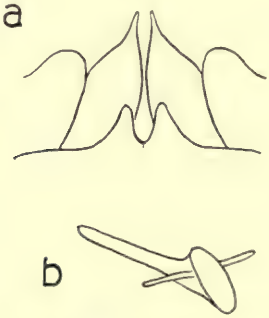

FIG. 88. *Ballomarius bilobatus* sp. n.
a, posterior margin of pregenital sternite, lateroventral portions of eighth segment and ventral lobes of first valvulae of ovipositor; *b*, sclerite at entrance to bursa copulatrix.

Described from one female taken at Fort Portal, Uganda, by H. Hargreaves (20 October 1926) Brit. Mus. 1948–549. Type in British Museum. *Ballomarius* is distinguished by the shape of the head and pronotum, and by the venation and the relatively short clavus. All the species assigned to this genus are either Oriental or African.

Ballomarius inermis sp. n.

(Fig. 89)

Female: length, 3·6 mm.; tegmen, 5·9 mm.

Testaceous marked with fuscous as in *B. bilobatus*.

Posterior margin of seventh abdominal sternite transverse or very broadly convex, ventral lobes of eighth abdominal segment broadly rounded at apex. Ovipositor with ventral lobes of first valvulae with inner margin straight, outer margin rounding distally into oblique apical margin; third valvulae fully 1·5 times longer than broad, incurved. Bursa copulatrix relatively small, unornamented; vagina large, with stout walls, a V-shaped sclerite near entrance to bursa, devoid of any processes.

Described from two females, one (Type) taken in the Gold Coast by A. E. Evans (1913) Brit. Mus. 1916–259, the other at Njala, Sierra Leone, by E. Hargreaves (8 December 1930) Brit. Mus. 1948–549. This species is readily distinguished from the foregoing by the characters of the abdomen and genitalia given. Type in British Museum.

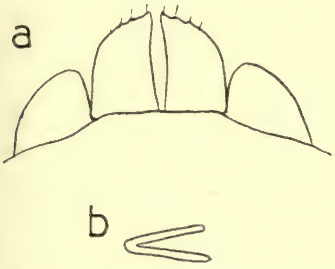

Fig. 89. *Ballomarius inermis* sp. n.

a, posterior margin of pregenital sternite, lateroventral portions of eighth segment and ventral lobes of first valvulae of ovipositor; *b*, sclerite at entrance to bursa copulatrix.

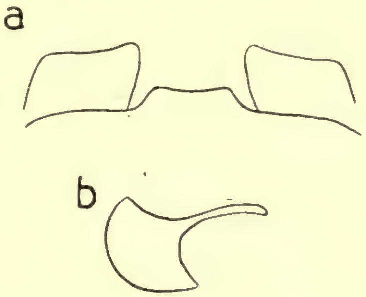

Fig. 90. *Ballomarius kawandanus* sp. n.

a, posterior margin of pregenital sternite and ventrolateral portions of eighth segment; *b*, sclerite at entrance to bursa copulatrix.

Ballomarius kawandanus sp. n.

(Fig. 90)

Female: length, 3·5 mm.; tegmen, 5·8 mm.

Testaceous marked with fuscous as in *B. bilobatus*.

Posterior margin of seventh abdominal sternite produced on median third in a rectangular lobe about five times as broad as long, with its distal margin slightly concave; ventral lobes of eighth abdominal segment distally angulate at apex but not produced in a point. Subvaginal plate very broad, occupying the whole of the ventral portion of the intersegmental membrane, little sclerotized. Bursa copulatrix devoid of ornamentation, a single spine, slightly curved and blunt at apex, at its entrance, arising from a sclerotized semicircular plate.

Described from one female collected at Kawanda, Uganda, by H. Hargreaves

(7 October 1939) Brit. Mus. 1948–549. Type in British Museum. This species is distinguished from the preceding by the characters of the abdomen and genitalia given above.

USANA Distant

1906. *Usana* Distant, *Fauna Brit. Ind. Rhynch.* **3**:293. Orthotype, *Usana lineolalis* Distant.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, broader across base than long in middle line (1·5:1), produced before eyes for about a third of their length, median carina distinct, prominent distally, disk not or scarcely depressed, anterior margin carinate, obtusely subangulately convex (about 130°), a distinct triangular areolet, much calloused, at each latero-apical angle of head, lateral margins carinate, straight, slightly diverging basad, posterior margin broadly concave; frons slightly convex in profile, longer in middle line than broad (about 1·2:1), widest part wider than base (1·6:1), basal margin truncate, median carina percurrent, lateral margins carinate, straight, diverging to below level of antennae thence gradually incurved to suture, not at all foliate; clypeus fully three-quarters of length of frons, medially and laterally carinate, rostrum with sub-apical segment shorter than apical, antennae subglobose, not sunk in a depression, ocelli narrowly separated from eyes, eyes scarcely excavate but slightly sinuate beneath, not overlapping pronotum. Pronotum moderately long, almost as long behind eyes as in middle line, anterior margin of disk broadly convex, posterior margin angulately excavate (115°), median carina distinct, lateral carinae straight, each 1·4 times as long as median carina, attaining hind margin, pronotum laterad of disk not inclined anteroventrally, a weak carina at margin between eye and tegula, ventral margin of lateral pronotal lobes slightly oblique; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate, pro-tibiae as long as pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina 3·2 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 155° at apex of clavus, Sc+R fork level with Cu1 fork, or slightly distad, M fork slightly basad of node, Cu1 fork slightly distad of union of claval veins, four small cells in Sc at margin distad of stigmal cell, seven areoles distad of these around apical margin; clavus terminating distad of middle of tegmen. Wings with R simple, M two-branched, Cu1a three-branched.

Usana lineolalis Distant

(Fig. 91)

1906. *Usana lineolalis* Distant, loc. cit.:294.

The figures are of Distant's type from Tenasserim. *Usana* is distinguished by the shape of the head and pronotum and by the tegminal venation. It differs from the neotropical *Phypia* Stål in the proportions and profile of the frons, in the shape of the eye, in the branching of M 1+2, and in the veinlets distad of the node.

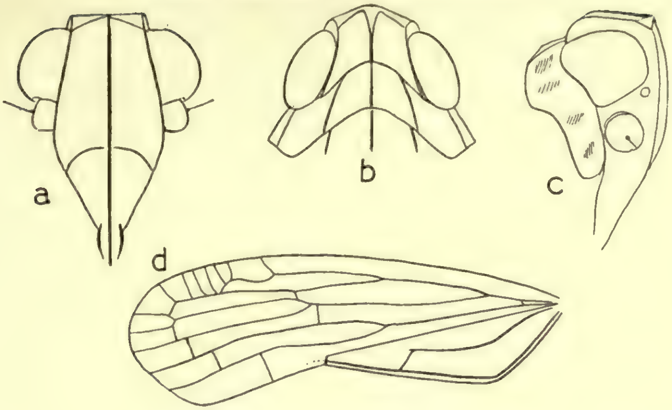

FIG. 91. *Usana lineolalis* Distant
a, frons and clypeus; *b*, vertex and pronotum; *c*, head and pronotum in profile; *d*, tegmen.

OPSIPLANON Fennah

1945. *Opsiplanon* Fennah, *Proc. U.S. nat. Mus.* **95**:477. Orthotype, *Opsiplanon ornatifrons* Fennah.

Head with eyes slightly narrower than pronotum. Vertex slightly declivous, broader across base than long in middle line (about 1·5:1), produced before eyes for about a third of their length, median carina present, prominent basally, disk not or very lightly depressed, anterior margin carinate, subrectangulately convex at apex, a small triangular areolet at each latero-apical angle of head, lateral margins carinate, straight or slightly concave, diverging basad, posterior margin shallowly excavate; frons shallowly convex in profile, only slightly longer in middle line than broad, widest part not quite twice as wide as base, basal margin convex-truncate, median carina percurrent, lateral margins carinate, foliate laterad distally, straight and diverging to below level of antennae, thence moderately incurved to suture; clypeus as long as frons in middle line, medially and laterally carinate, slightly, tumid rostrum attaining post-trochanters, antennae subglobose, not sunk in a depression, ocelli narrowly separated from eyes, eyes excavate beneath, not overlapping pronotum. Pronotum moderately short, not as long behind eyes as in middle line, anterior margin of disk convex, posterior margin angulately excavate (115°), median carina distinct, lateral carinae of disk straight or slightly convex, each 1·5 times as long as median carina, attaining hind margin, pronotum laterad of disk not inclined antero-ventrally, three supernumerary carinae on each side behind eyes, two carinae at each lateral margin between eye and tegula, ventral margin of lateral pronotal lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, post-tibiae with a single spine basad of middle.

Tegmina about 2·9 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 155° at apex of clavus, Sc+R+M fork about two-ninths from base, Sc+R fork near stigma, M fork at level of node, Cu1 fork level with union of claval veins, stigmal cell small, quadrate, eight areoles along apical margin distad of it; clavus terminating distinctly distad of middle of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Ventral lobes of first valvulae of ovipositor almost as broad as long, apical margin rounded or oblique, dentate; third valvulae quadrate, produced into a short lobe at ventral end of apical margin.

Opsiplanon ornatifrons Fennah

(FIG. 92)

1945. *Opsiplanon ornatifrons* Fennah, loc. cit.: 477.

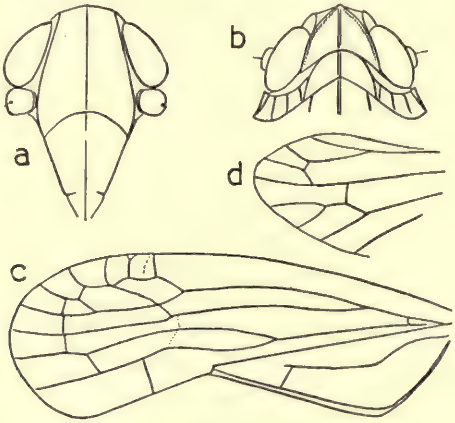

FIG. 92. *Opsiplanon ornatifrons* Fennah.
a, frons and clypeus; *b*, vertex and pronotum; *c*, tegmen; *d*, apex of wing.

The figures are of the type species. In the original description it was stated that Sc and R separated one-seventh from the base. This should be emended as given above. *Opsiplanon* is distinguished by the carination of the vertex, the proportions of the frons and clypeus, and by the tegminal venation. Its two species, *ornatifrons* Fenn. and *nemorosus* Fenn., are structurally very similar; it is possible that the prominent luteous spots along the sides of the veins in the corium represent a generic character. The genus occurs in Trinidad but not in the Lesser Antilles.

PARARGELEUSA gen. n.

Head with eyes a little narrower than pronotum. Vertex not or only slightly declivous, broader across base than long in middle line (1·2:1), produced before eyes for half their length, median carina distinct throughout, disk only slightly depressed between median carina and margins, anterior margin carinate, subrectangulately convex, a relatively large triangular areolet at each latero-apical margin of head, lateral margins straight, carinate, diverging basad, posterior margin excavate, truncate behind disk; frons slightly convex in profile, as broad as long in middle line, widest part wider than base (1·7:1), basal margin shallowly convex, median carina percurrent, lateral margins carinate, not foliate distally, sinuately expanding to below level of antennae thence markedly incurved to suture, disk not depressed; clypeus fully three-quarters of length of frons, medially and laterally carinate, antennae subglobose, not sunk in a depression but slightly roofed over by eye, ocelli only narrowly separated from eyes, eyes excavated beneath, moderately overlapping pronotum. Pronotum short, not as long behind eyes as in middle line, anterior margin of disk truncate, posterior margin angulately excavate (120°), median carina distinct, lateral carinae of disk straight, each nearly three times as long as median carina, attaining hind margin, pronotum laterad of disk markedly inclined antero-ventrally, lateral margins not carinate, ventral margin of lateral pronotal lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina about three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of about 155° at apex of clavus, Sc+R fork slightly distad of Cu1 fork, M forked about level with node, Cu1 fork about level with union of claval veins, about eight areoles around apical margin distad of stigmal cell; clavus terminating at middle of tegmen.

Type species, *Parargeleusa trispinosa* sp. n.

Parargeleusa trispinosa sp. n.

(Fig. 93)

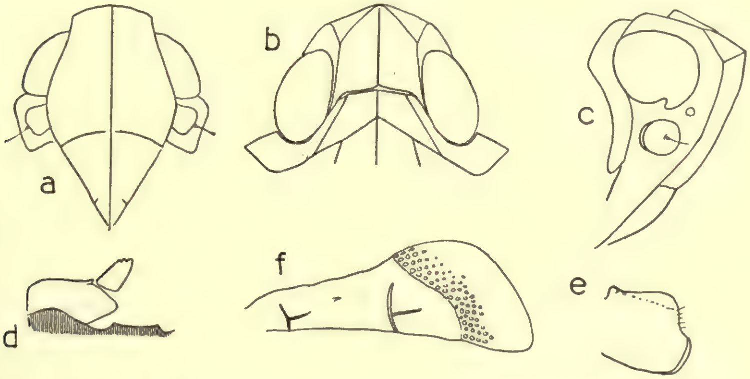

Fig. 93. *Parargeleusa trispinosa* gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head and pronotum in profile; *d*, right half of female genitalia in ventral view; *e*, third valvula of ovipositor; *f*, vagina and bursa copulatrix.

Female: length, 3·0 mm.; tegmen, 3·1 mm.

Testaceous to pale fuscous, disk of vertex and mesonotum rather more deeply infuscate. Tegmina translucent, yellowish-brown, three brown oblique spots in costal cell; stigma, apical areoles and distal half of subapical areoles infuscate, apical margin sometimes red. Wings smoky, margined with red.

Seventh abdominal sternite of female with posterior margin slightly produced posteriorly in median third. Ventral lobes of eighth segment angulate at lower margin. Ovipositor with ventral lobes of first valvulae straight on inner margin, oblique, rounding to apex on outer margin, apical margin coarsely dentate; third valvulae quadrate, ventral margin straight, dorsal margin convex, apical margin produced in a convex lobe in its lower half. Bursa copulatrix beset uniformly with minute rings, not ornamented with sclerites, vagina relatively large, bearing two T-shaped sclerites and a small spine midway between them.

Described from three females collected at Camp 2, 2,000 ft., Sabron, Cyclops Mts., Dutch New Guinea, by L. E. Cheeseman (1936) Brit Mus. 1936–271. *Parargeleusa* is distinguished by the shape of the head and pronotum and by the tegminal venation. It differs from *Argeleusa* in the characters given in the key, and from *Cythna* and *Nephelia* in the slope of the frontal disk and the absence of marginal carinae on the pronotum.

ARGELEUSA Kirkaldy

1906. *Argeleusa* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1** (9):423. Haplotype, *Argeleusa kurandae* Kirkaldy.

Head with eyes slightly narrower than pronotum. Vertex not or slightly declivous, as broad across base as long in middle line, produced before eyes for less than a quarter their length, median carina distinct, disk slightly depressed between median carina and margins, anterior margin carinate and calloused, acutely convex on its discal side, broadly convex along its junction with frons, a long triangular areolet, only shallowly depressed in middle, at each latero-apical angle of head, lateral margins carinate and more or less calloused, subparallel between eyes, posterior margin concave or angulately emarginate; frons slightly convex in profile, slightly longer in middle line than broad, widest part twice as wide as base, basal margin slightly concave, median carina percurrent, lateral margins carinate, scarcely foliate laterad distally, diverging straight or slightly concave to below level of antennae thence incurved to suture; clypeus about three-quarters of length of frons, medially and laterally carinate, antennae subglobose, not sunk in a depression, ocelli contiguous with eyes, eyes flattened but not excavated beneath, only slightly overlapping pronotum. Pronotum moderately short, about as long behind eyes as in middle line, anterior margin of disk broadly convex, posterior margin angulately excavate (115°), median carina distinct, lateral carinae of disk straight or slightly convex, each about twice as long as median carina, attaining hind margin, pronotum laterad of disk not or only slightly inclined anteroventrally, an indication of three supernumerary carinae behind eyes, lateral margins carinate, ventral margin of lateral pronotal lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, pro-tibiae sub-equal to pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina about three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of about 150° at apex of clavus, Sc+R forked at about same level as Cu1 and union of claval veins, M forked at level of node, veins prominent, granulate, eight areoles around apical margin distad of stigmal cell; clavus terminating distad of middle.

Argeleusa kurandae Kirkaldy

(FIG. 94)

1906. *Argeleusa kurandae* Kirkaldy, loc. cit.: 423.

The figures are of a specimen in the British Museum.

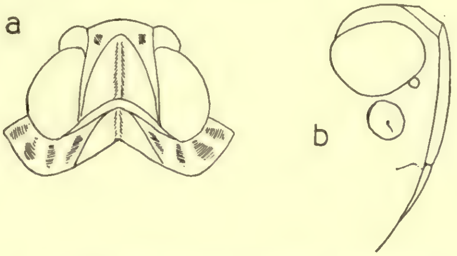

FIG. 94. *Argeleusa kurandae* Kirkaldy.
a, vertex and pronotum; *b*, head in profile.

EPIUSANA gen. n.

Head with eyes rather narrower than pronotum. Vertex not declivous, broader across base than long in middle line (1·2:1), produced before eyes for about three-eighths of their length, median carina present throughout, anterior margin carinate, forming a slightly truncated angle of 90° at apex, lateral margins straight, diverging basad, posterior margin subtruncate or very shallowly concave, disk scarcely depressed, a distinct triangular areolet at each latero-apical angle of head; frons slightly convex in profile, longer in middle line than broad (1·8:1), widest part about 1·5 times width at base, median carina percurrent, lateral margins carinate, slightly convex to below level of antennae thence gradually incurved to suture, not foliate, disk not depressed; clypeus half as long as frons, medially and laterally carinate; rostrum short, scarcely surpassing mesotrochanters, subapical segment almost as long as apical; antennae subglobose, not sunk in a depression, ocelli very narrowly separated from eyes, eyes excavate beneath, slightly overlapping pronotum. Pronotum moderately long, anterior margin of disk convex-truncate, posterior margin broadly concave, median carina present, lateral carinae of disk straight, each twice as long as median carina, attaining hind margin, pronotum laterad of disk moderately inclined anteroventrally, ventral margin of lateral lobes oblique; mesonotum longer than vertex and pronotum together, distinctly tricarinate, pro-tibiae about as long as pro-femora with trochanters.

Tegmina three times as long as broad, Sc+R fork level with Cu1 fork, both about level with union of claval veins, M forked only very slightly basad of level of node, M1+2 apparently forked at apical line of transverse veins, or close to it, five areoles in Sc and R at margin distad of stigmal cell, apical areoles shorter than sub-apical but markedly longer than broad; clavus terminating at middle of tegmen or scarcely basad of middle.

Type species, *Epiusana rugiceps* sp. n.

Epiusana rugiceps sp. n.

(FIG. 95)

Female: length, 3·5 mm.; tegmen, 4·4 mm.

Vertex with three longitudinal ridges in anterior half, one on each side of median carina.

Pale yellow; median carina and sublateral carinae of vertex and pronotum opaque yellowish-white, eyes testaceous; a line on each side of median carina of vertex and a linear spot laterad of each sublateral carina of vertex black. Tegmina very pale yellowish-white with a trace of pale brown at apex of costal cell.

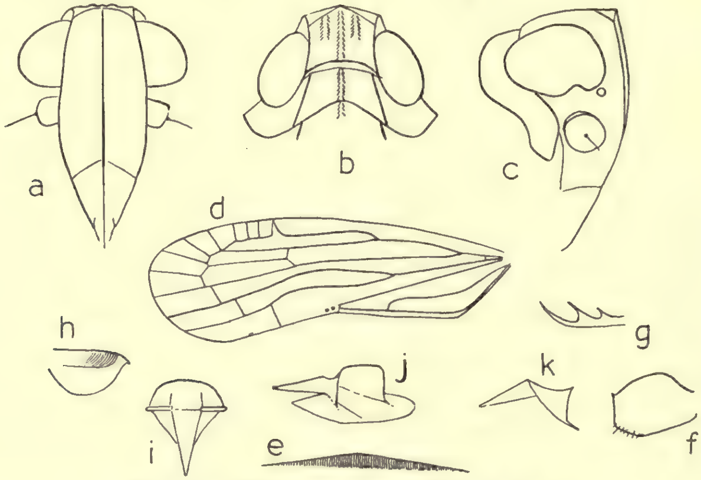

FIG. 95. *Epiusana rugiceps* gen. et sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, head and pronotum in profile; *d*, tegmen; *e*, posterior margin of pregenital sternite; *f*, third valvula of ovipositor; *g*, apex of first valvula; *h*, second valvula, lateral view; *i*, *j*, *k*, dorsal, posterolateral, and lateral views of sclerite at entrance to bursa copulatrix.

Anal segment of female as broad as long or broader, telson exceeding apical margin by half its length. Posterior margin of seventh abdominal sternite of female transverse-convex. Ovipositor with first valvulae bearing a single prominent spine at apex, a second three-quarters of length of preceding basad of it, a third spine, broader and smaller, equidistant basally; second valvulae with dorsal margin horizontal, sclerotized, terminating apically in a small deflexed point, ventral margin strongly convex; third valvulae in profile subquadrate, ventral margin straight, apical margin subangulately convex, dorsal margin convex, a horizontal lobe dorsomesally. Bursa copulatrix uniformly covered with delicate rings, unarmed with sclerites; a more or less hollow spine arising from an approximately semicircular sclerite near entrance to bursa.

Described from one female collected on Mt. Mlanje, Nyasaland, by S. A. Neave (23 February 1913) Brit. Mus. 1913–140. Type in Brit. Mus. This genus differs from *Usana* in the width of the pronotum behind the eyes (this being relatively shorter than in *Usana*), in the proportions of the frons and clypeus, and in the shorter rostrum, as well as in the relative length of the clavus. It is also separated from *Ballomarius* by this last character, and by the position of the forks of M in the tegmen. It differs in less degree from *Ballomarius* in the shape of the pronotal disk and the ratio of its length to that of the frons, as well as in the shorter rostrum. It is not known whether the curious ridges on the vertex have more than specific value. As the hind legs are missing in the type, the condition of the post-tibial spine can only be surmised: it is unlikely that it differs from that in *Usana* and *Ballomarius*.

PHENELIA Kirkaldy

1906. *Phenelia* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **1** (9):417, 421. Haplotype, *Phenelia elidipteroides* Kirkaldy.

Head with eyes a little narrower than pronotum. Vertex not or scarcely declivous, broader across base than long in middle line (1·3:1), produced before eyes for about a third of their length, median carina percurrent, prominent, disk slightly depressed, anterior margin carinate, acutely convex, forming an angle of about 70° at apex, anterior margin of head shallowly convex or subtruncate, a distinct triangular areolet at each latero-apical angle of head, lateral margins carinate, diverging basad, posterior margin broadly concave; frons slightly convex in profile, longer in middle line than broad, widest part twice as wide as base, basal margin slightly concave, median carina percurrent, lateral margins carinate, very slightly foliate distally, straight or slightly convex to below level of antennae, thence moderately incurved to suture; clypeus three-quarters of length of frons, medially and laterally carinate, antennae subglobose, not sunk in a depression, ocelli scarcely separated from eyes, eyes slightly overlapping pronotum. Pronotum short, shorter behind eyes than in middle line, anterior margin of disk convex-truncate, posterior margin angulately excavate (about 110°), median carina distinct, lateral carinae straight or slightly sinuate, each 1·5 times as long as median carina, attaining hind margin, pronotum laterad of disk markedly inclined anteroventrally, a weak carina at lateral margin between eye and tegula, ventral margin of lateral pronotal lobes slightly oblique; mesonotum longer than vertex and pronotum combined, tricarinate, pro-tibiae subequal to pro-femora with trochanters, post-tibiae unarmed or with a minute single spine basad of middle.

Tegmina about three times as long as broad, not granulate, costal margin slightly convex, sutural margin forming a re-entrant angle of about 155° at apex of clavus, Sc+R fork slightly distad of or about level with Cu1 fork, both nearly level with union of claval veins, M forked at level of node, eight areoles around apical margin distad of stigmal cell, three areoles markedly longer than broad, clavus terminating distad of middle of tegmen.

Phenelia elidipteroides Kirkaldy

(Fig. 96)

1906. *Phenelia elidipteroides* Kirkaldy, loc. cit.: 422.

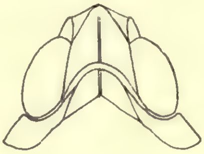

Fig. 96. *Phenelia elidipteroides* Kirkaldy.
Vertex and pronotum.

When he redefined the genus in 1907 Kirkaldy recognized two subgenera (here treated as genera). For his subgenus *Phenelia* he designated *elidipteroides* Kirk. as the type species.

NEPHELIA Kirkaldy

1907. *Nephelia* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **3**: 117. Orthotype, *Nephelia bicuneata* Kirkaldy, loc. cit.: 117.

Head with eyes rather narrower than pronotum. Vertex not or scarcely declivous, broader across base than long in middle line (1·3:1), produced before eyes for about a fifth of their length, median carina present, not prominent, disk scarcely depressed, anterior margin strongly convex, anterior margin of head more weakly so, a rather obscure triangular areolet at each latero-apical angle of head, lateral margins carinate, diverging basad, posterior margin broadly concave or subtruncate, frons slightly convex in profile, slightly longer in middle line than broad (1·1:1), widest part 1·9 times width at base, basal margin truncate or slightly excavate, median carina percurrent, lateral margins carinate, very slightly foliate laterad distally, straight or slightly convex to below level of antennae, thence incurved to suture, clypeus about three-quarters of length of frons, medially and laterally carinate, antennae subglobose, not sunk in a depression, ocelli narrowly separated from eyes, eyes not or scarcely overlapping pronotum. Pronotum moderately short, about two-fifths of length of head in middle line, as long behind eyes as in middle line, anterior margin of disk subtruncate, posterior margin angulately excavate (120°), median carina distinct, lateral carinae slightly concave, each about twice as long as median carina, attaining hind margin, pronotum laterad of disk moderately inclined antero-ventrally, two carinae, one feeble, at lateral margins between eyes and tegula, ventral margin of lateral pronotal lobes very slightly oblique; mesonotum longer than vertex and pronotum combined, tricarinate, pro-tibiae slightly shorter than pro-femora with trochanters, post-tibiae armed with a single spine basad of middle.

Tegmina about three times as long as broad, not granulate, costal margin slightly convex, sutural margin forming a re-entrant angle of about 150° at apex of clavus, Sc+R fork about level with Cu1 fork, both slightly distad of union of claval veins, M forked at level of node, seven or eight areoles, distinctly longer than broad, around apical margin distad of stigmal cell; clavus terminating distad of middle of tegmen.

Nephelia tristis Kirkaldy

(Fig. 97)

1907. *Nephelia tristis* Kirkaldy, loc. cit.: 117.

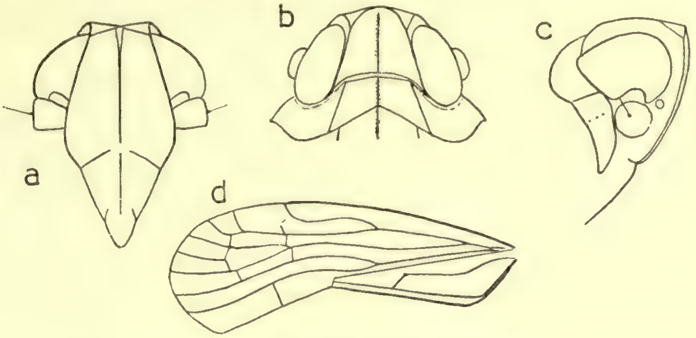

Fig. 97. *Nephelia tristis* Kirkaldy.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head and pronotum in profile; *d*, tegmen.

It is possible that the pair of pallid wedge-like markings, narrowly bordered with fuscous, in the costal cell, will prove to be generic characters: they are present in the two known species, *bicuneata* and *tristis* Kirk. The genus is at present known only from Fiji. The figures are of a topotype in the Bishop Museum, Honolulu.

CALLINESIA Kirkaldy

1907. *Callinesia* Kirkaldy, *Bull. Hawaii. Sug. Ass. ent. Ser.* **3**: 116, 118. Orthotype, *Callinesia pulchra* Kirkaldy.

Head with eyes distinctly narrower than pronotum. Vertex declivous, very slightly longer in middle line than broad across base, produced before eyes for about a quarter of their length, median carina present only in basal half, disk hollowed out, anterior margin carinate, convex-truncate in genotype, apparently angulately convex in other species, a triangular areolet at each latero-apical angle of head, lateral margins carinate, slightly foliate, subparallel (genotype) or diverging basad, posterior margin subtruncate or broadly concave; frons distinctly convex in profile, markedly incurved to frontoclypeal suture throughout its width, longer in middle line than broad (1·1:1 genotype), widest part wider than base (approximately 2:1), basal margin truncate, median carina present basally, more or less obsolete distally, lateral margins carinate, diverging straight to below level of antennae thence incurved strongly to suture, slightly foliate distally; suture distinctly impressed, clypeus two-thirds of length of frons, medially and laterally carinate, median carina rather broad or weak, rostrum with subapical segment as long as apical, reaching meso-trochanters, antennae relatively large, subglobose, not sunk in a depression but roofed over by eyes, ocelli touching eyes, eyes strongly excavate below, moderately overlapping pronotum. Pronotum short, not quite as long behind eyes as in middle line, anterior margin of disk convex-truncate, posterior margin angulately excavate (100°), median carina distinct, lateral carinae straight or slightly concave, each twice as long as median carina, attaining hind margin, pronotum laterad of disk distinctly inclined anteroventrally, two carinae at lateral margins between eye and tegula, ventral margin of lateral pronotal lobes slightly oblique; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate; pro-tibiae equal to or slightly shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina 2·9 times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 150° at apex of clavus, Sc+R fork about level with Cu1 fork, both distad of union of claval veins but basad of apex of clavus, M fork level with node, seven or eight areoles, longer than broad, distad of stigmal cell around apical margin; clavus terminating distad of middle of tegmen. Wings with R simple, M two-branched, Cu1 three-branched.

Callinesia pulchra Kirkaldy

(Fig. 98)

1907. *Callinesia pulchra* Kirkaldy, loc. cit.: 118, pl. 9, fig. 17.

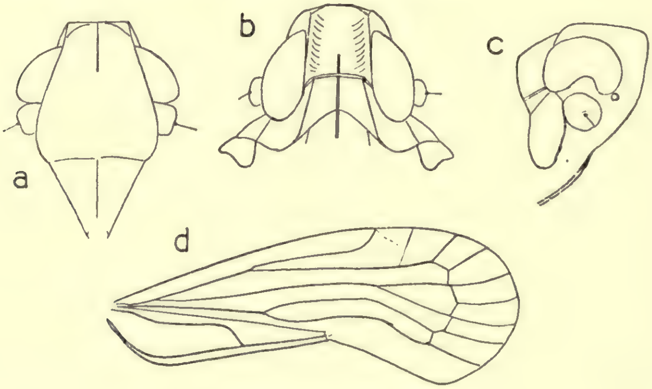

Fig. 98. *Callinesia pulchra* Kirkaldy.
a, frons and clypeus; *b*, vertex and pronotum; *c*, head and pronotum in profile; *d*, tegmen.

The figures are of a cotype in the British Museum. *Callinesia* is distinguished by the structure of the head and pronotum and by the tegminal venation. Kirkaldy included among the generic characters a black spot on the mesopleura. His four species, *pulchra*, *ornata*, *venusta*, and *pusilla*, are from Fiji. Melichar has transferred *Paratangia fimbriolata* Mel. to this genus.

NECHO Jacobi

1910. *Necho* Jacobi, *Wiss. Ergeb. Schwedischen Zool. Exped. Kilimanjaro-Meru* 1905–1906, **12** (7): 105. Orthotype, *Necho naevius*, ibid.: 105.

Head with eyes narrower than pronotum. Vertex not declivous, broader across base than long in middle line (2:1), produced before eyes for about a third of their length, median carina present throughout, disk only slightly depressed, anterior margin carinate, angulately convex at apex (140°), a small triangular facet at each latero-apical angle of head, lateral margins carinate, straight, diverging basad, posterior margin broadly angulately excavate (140°), frons slightly convex in profile, longer in middle line than broad (1·2:1) widest part twice as wide as base, basal margin convex-truncate, median carina percurrent, slightly thickened at base, disk not depressed but markedly incurved to suture, lateral margins carinate, straight and diverging to below level of antennae, thence moderately incurved to suture; suture impressed, clypeus two-fifths of length of frons in middle line, medially and laterally carinate, slightly tumid, antennae subglobose, not sunk in a depression, ocelli distinctly separated from eyes, eyes not excavate beneath, or scarcely so, only slightly overlapping pronotum, if at all. Pronotum moderately short, not quite as long behind eyes as in middle line, anterior margin of disk broadly convex, posterior margin angulately excavate (130°), median carina distinct, lateral carinae of disk straight, each 1·3 times as long as median carina, attaining hind margin, pronotum laterad of disk not or scarcely inclined anteroventrally, three supernumerary carinae on each side behind eyes, two carinae at each lateral margin between eye and tegula, ventral margins of lateral pronotal lobes oblique; mesonotum longer than vertex and pronotum combined, tricarinate, pro-tibiae slightly shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina about two and a half times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of 150° at apex of clavus, Sc obscure, apparently separated from R near base, M forked at level of node, Cu1 forked at level of union of claval veins; stigmal cell longer than broad, eight areoles along apical margin distad of it; clavus terminating at middle of tegmen.

Necho may well be congeneric with *Cnidus* Stål; it is also extremely close in superficial characters to the neotropical *Opsiplanon*. It apparently differs from the latter in the relatively shorter clypeus, the entire eyes, the relatively broader pronotal disk, the shape of the stigmal cell and the unbranched condition of M1+2 before the apical line of transverse veins. The two species of *Necho*, *naevius* and *marmoratus* Jacobi, are known only from East Africa.

MAGADHA Distant

1906. *Magadha* Distant, *Fauna Brit. Ind. Rhynch.* **3**:290. Orthotype, *Cixius flavisigna* Walker.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, broader across base than long in middle line (1·8:1), produced before eyes for a third of their length, median carina distinct basally, obsolete distally, disk markedly depressed, anterior margin carinate, angulately convex (about 120°) at apex, a triangular areolet at each latero-apical angle of head, lateral margins carinate, slightly foliate, diverging basad, posterior margin broadly concave; frons slightly convex in profile, longer in middle line than broad (1·5:1), widest part almost twice as wide as base, basal margin truncate or slightly excavate, median carina percurrent, lateral margins carinate, slightly foliate laterad distally, sinuately diverging to below level of antennae thence gradually incurved to suture; clypeus four-fifths of length of frons in middle line, medially and laterally carinate, rostrum with subapical segment distinctly shorter than apical (1:1·3), antennae subglobose, not sunk in a depression, ocelli separated from eyes, eyes not excavate, not or scarcely overlapping pronotum. Pronotum fairly long, a little shorter behind eyes than in middle line, anterior margin of disk convex-truncate, posterior margin subangulately excavate (about 115°) median carina distinct, lateral carinae slightly convex, each twice as long as median carina, attaining hind margin, pronotum laterad of disk only slightly inclined antero-ventrally, lateral margins carinate between eye and tegula, ventral margins of lateral pronotal lobes markedly oblique; mesonotum longer than vertex and pronotum combined, tricarinate, anterior third of disk minutely granulate, pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine about one quarter from base.

Tegmina about 3·2 times as long as wide, costal margin slightly convex, sutural margin forming a re-entrant angle of 155° at apex of clavus, Sc+R fork level with Cu1 fork, both almost level with union of claval veins, M fork level with node, eight areoles around apical margin distad of stigmal cell; clavus terminating distad of middle of tegmen. Wings with R two-branched, M two-branched, Cu1 three-branched.

Magadha flavisigna (Walker)

1851. *Cixius flavisigna* Walker, *List Hom. Ins. Brit. Mus.* **2**:348.

This species has the carinae of the vertex and pronotum a little less raised and the pronotum slightly longer than in *nebulosa* Dist.

Magadha nebulosa Distant

(Fig. 99)

1906. *Magadha nebulosa* Distant, *Fauna Brit. Ind. Rhynch.* **3**:291.

The figures are of Distant's holotype.

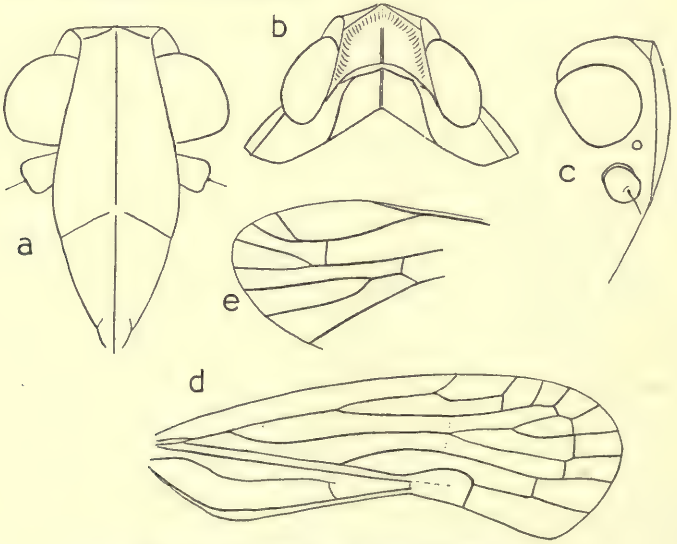

Fig. 99. *Magadha nebulosa* Distant.
frons and clypeus; *b*, vertex and pronotum; *c*, head in profile; *d*, tegmen; *e*, apex of wing.

KEMPIANA Muir

1922. *Kempiana* Muir, *Rec. Indian Mus.* **24**:354. Orthotype, *Kempiana maculata* Muir.

Head with eyes distinctly narrower than pronotum. Vertex not declivous, broader across base than long in middle line (about 1·5:1), produced before eyes for two-fifths of their length, median carina absent, or only faintly indicated at base, disk hollowed out, anterior margin carinate, angulately convex (about 140°) at apex, a minute to evanescent triangular areolet at each latero-apical angle of head, lateral margins carinate, subfoliate, moderately diverging basad, posterior margin angulately excavate (130°); frons slightly convex in profile, longer in middle line than broad (1·5:1), widest part about twice as wide as base, basal margin truncate or slightly excavate, median carina percurrent, lateral margins carinate, slightly foliate obliquely distally, sinuately diverging to below level of antennae thence gradually incurved to suture; clypeus two-thirds of length of frons in middle line, medially and laterally carinate, antennae subglobose, not sunk in a depression, ocelli large, touching eyes, eyes not or scarcely overlapping pronotum. Pronotum moderately short, shorter behind eyes than in middle line, anterior margin of disk convex, posterior margin rectangulately emarginate, median carina distinct, lateral carinae slightly convex, each twice as long as median carina, attaining hind margin, pronotum laterad of disk only slightly inclined anteroventrally, lateral margins carinate between eye and tegula, ventral margins of lateral pronotal lobes oblique; mesonotum more than twice as long as vertex and pronotum combined, tricarinate, anterior third of disk minutely and evenly granulate, this area separated from posterior portion of disk by a transverse callus, lateral fields of mesonotum similarly granulate in part, tegulae carinate, pro-tibiae as long as pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina 3·2 times as long as broad, costal margin distinctly convex in basal portion, sutural margin forming a re-entrant angle of 150° at apex of clavus, costal vein with the membrane forming a distinct costal area, Sc+R fork slightly basad of Cu1 fork, both scarcely distad of union of claval veins, M forked level with node, eight areoles around apical margin distad of stigmal cell; clavus terminating distad of middle of tegmen.

Kempiana maculata Muir

(FIG. 100)

1922. *Kempiana maculata* Muir, loc. cit.:354.

The figures are of a specimen in the British Museum. *Kempiana*, as noted by Muir, is very close to *Magadha*. The type species differ in the proportions of the vertex and in the basal portion of the costal margin of the tegmina, both occur in the same geographical region, and it is not impossible that intermediate forms will be discovered

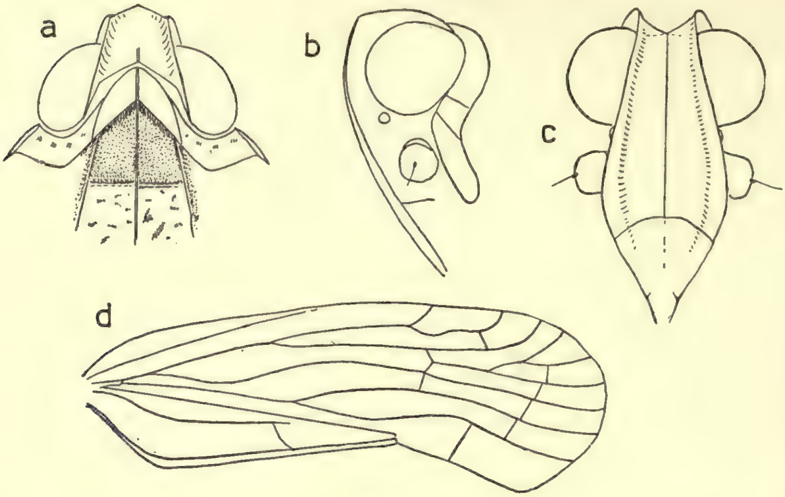

FIG. 100. *Kempiana maculata* Muir.
a, vertex, pronotum and anterior portion of mesonotum; *b*, head in profile; *c*, frons and clypeus; *d*, tegmen.

CATONIA Uhler

1895. *Catonia* Uhler, *Proc. zool. Soc. Lond.*:61. Logotype, *Catonia intricata* Uhler.

Head with eyes distinctly narrower than pronotum. Vertex not or only slightly declivous, broader across base than long in middle line (genotype, 1·3:1), produced before eyes for a third of their length, median carina present on basal three-quarters, absent from apical quarter, disk hollowed, anterior margin carinate, rectangulately convex at apex, a prominent oblique triangular areolet at each latero-apical angle of head, lateral margins carinate, subfoliate, moderately diverging basad, posterior margin angulately excavate (110°), frons slightly convex in profile, longer in middle line than broad (1·1:1), widest part nearly three times as wide as base, basal margin slightly excavate, median carina percurrent, lateral margins carinate, distinctly foliate laterad distally, diverging to below level of antennae thence gradually incurved to suture; clypeus as long as frons in middle line, medially and laterally carinate, rostrum with subapical joint longer than apical or subequal, antennae subglobose, sunk in a depression, ocelli touching eyes, eyes minutely excavate, moderately overlapping pronotum. Pronotum short, shorter behind eyes than in middle line, anterior margin of disk truncate, posterior margin angulately excavate (120°), median carina distinct, lateral carinae straight or slightly concave, each more than twice as long as median carina, scarcely attaining hind margin, pronotum laterad of disk strongly inclined anteroventrally, posterior third only moderately so, a more or less feeble indication of three supernumerary carinae behind eyes, two very obscure carinae at each lateral margin between eye and tegula, ventral margin of lateral pronotal lobes transverse; mesonotum longer than vertex and pronotum combined, tricarinate, tegulae not carinate, pro-tibiae shorter than pro-femora with trochanters, post-tibiae with a single spine basad of middle.

Tegmina three times as long as broad, costal margin slightly convex, sutural margin forming a re-entrant angle of about 150° at apex of clavus, Sc+R fork level with Cu1 fork, both only slightly distad of union of claval veins, M fork at level of node, nine areoles around apical margin distad of stigmal cell; clavus terminating distad of middle of tegmen. Wings with R two-branched, M two-branched, Cu1 three-branched.

Anal segment of female almost twice as broad as long, excluding anal style; anal foramen large, anal style spatulate. Subvaginal plate quadrate, ventral and lateral margins sclerotized and pigmented. Ventral lobes of first valvulae approximately triangular, sometimes with a lobe attached laterally at base. Bursa copulatrix ornamented with sclerotized and unpigmented rings with walls of varying thickness according to species, each ring beset with a number of minute papillae.

Egg ovoid, 1·8 times as long as wide, surface smooth, micropyle surrounded by a ring of finger-like processes of equal length and joined in pairs.

The type species of *Catonia* Uhler has generally been accepted as *nava* Say on the basis of Van Duzee's 1917 designation. The earliest type fixation for this genus, however, is apparently that of Van Duzee (Van Duzee, 1907) which is embodied under the genus *Catonia* Uhler (accompanied by a bibliographical citation) in the following sentence: 'All, including *intricata*, the type species, have a minute spine. . . .'

Catonia is the most widespread of West Indian Achilid genera, and has species in every island: as is evident from the specific differences it includes several distinct groups of species, each of which, when investigated more fully, may have to be recognized as a subgenus. For the present the writer recognizes two subgenera separated as follows:

1 (2) Vertex distinctly broader than long; greatest width of frons about 1·5 times width at base . . . . **Pyren** subgen. nov.
2 (1) Vertex about as long as broad; greatest width of frons fully twice width at base. . . . . **Catonia** subgen. nov.

The subgenus *Catonia* (type species *C. intricata* Uhler) includes species with a sclerotized plate on the wall of the bursa copulatrix and species without such a plate. In *Pyren* (type species *Catonia saltator*, described below) the bursa copulatrix is unarmed.

Catonia intricata Uhler

(FIG. 101)

1895. *Catonia intricata* Uhler, *Proc. zool. Soc. Lond.*: 61.

Female: length, 4·1 mm.; tegmen, 4·6 mm.

Tegmina with Sc+R forking just basad of middle, Cu1 forking slightly distad of Sc+R fork, Cu1b simple, its cell not divided. Wings with apical cell R1 with a stalk distad of R–M transverse vein.

Fuscous, uniformly and minutely speckled testaceous or pallid, but dark colour predominant. Tegmina fuscous, speckled uniformly on corium; a spot in costal cell at base, a broad interrupted obliquely transverse fascia from distal quarter of costal cell to apex of clavus, transverse line of cross-veins, tips of apical veins and an arcuate band across distal three-quarters of apical cells but not attaining margin, base of clavus and a spot on commissural margin one-third from apex, pale or translucent testaceous. Abdomen with a short transverse pale bar medially in anterior half of sixth sternite, this bar not at all triangular.

Ovipositor with ventral lobes rhomboidal with distal angle in ventral view narrow, mesal margin convex in distal half; no accessory lobate expansions laterally at base; disk auriculate, with a deep curved hollow suggestive of a perforation. Subvaginal plate 1:3 times as high as broad across base, lateral margins parallel in ventral portion, diverging markedly dorsad, transverse pigmented area occupying ventral third of plate.

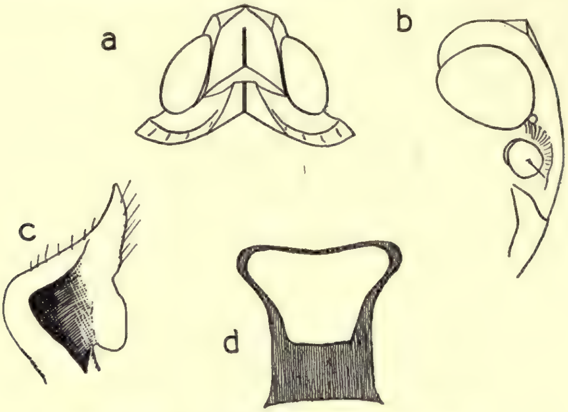

FIG. 101. *Catonia intricata* Uhler.
a, vertex and pronotum; *b*, head in profile; *c*, ventral lobe of first valvula of ovipositor; *d*, subvaginal plate.

Described from two females collected by the writer in mountain forest near Three Rivers, St. Vincent, B.W.I. (3 September 1941) resting on an aroid and *Cordia* sp. respectively. This species is readily distinguished from *sancti-vincenti* (below) by the more uniformly speckled and much darker mesonotum and by the absence of pallid bands on the legs; it differs markedly in size and in the female genitalia. Figures *a*, *b*, and *c* are of Uhler's female holotype.

Catonia sancti-vincenti sp. n.

(FIG. 102)

Male: length, 3·2 mm.; tegmen, 3·3 mm. Female: length, 4·0 mm.; tegmen, 4·1 mm. Sc+R forking slightly more than two-fifths from base, Cu forking slightly distad of Sc+R fork, Cu1b simple, but cell Cu1b sometimes traversed by one or more veins at right angles to margin. Wing with cell R1 with a distinct stalk before transverse vein.

Dull brown mottled creamy-testaceous; a median ochraceous line, or triangle, ventrally on sixth abdominal segment. Tegmina with a tinge of red at apex of costal cell, and on Sc+R, M, and Cu.

Anal segment of male in dorsal view subquadrate, anal foramen situated in distal half, apical margin deflexed, asymmetrical, with a lobe on right side. Phallobase with two expanding and flattened lobes dorsally, ventrally with a stout curved sclerotized bar on either side of middle line, each bifurcate in distal third. Aedeagal appendages unequal, the shorter abruptly narrowed into a spine at apex. Pygofer with medioventral process subquadrate, lateral margins slightly converging distally, apical margin truncate-convex. Genital styles in side view expanding to near apex, ventral and apical margins meeting in a right angle; dorsal margin with a pair of pointed lobes on an eminence three-quarters from base; inner face near base with two small lobes and a long sinuate spine directed dorsally.

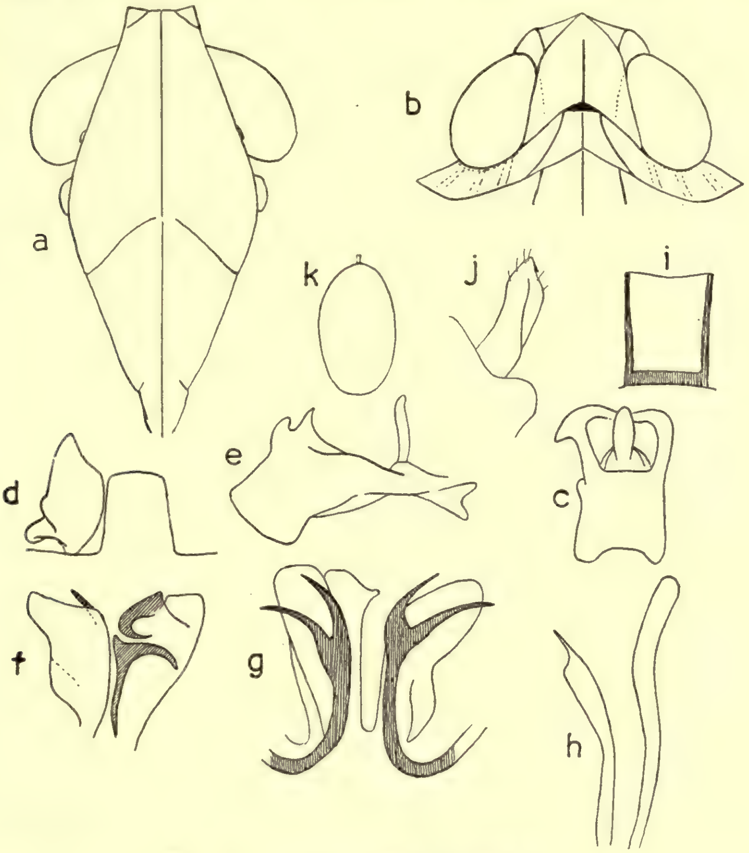

FIG. 102. *Catonia sancti-vincenti* sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, anal segment of male; *d*, medioventral process of pygofer and right genital style; *e*, right genital style, lateral view; *f*, phallobase, dorsal view; *g*, same, ventral view; *h*, phallic appendages; *i*, subvaginal plate; *j*, ventral lobe of first valvula; *k*, egg.

Female with subvaginal plate longer than broad (about 1·3:1) quadrate, narrowly sclerotized laterally and slightly more broadly on ventral margin. Ventral lobe of first valvula about three times as long as broad, with margins subparallel, apex acute, ventral surface with a straight crease.

Described from four males and three females collected by the writer at 600 feet in mountain forest, Three Rivers settlement, St. Vincent, B.W.I. (1–6 September 1941). Type in U.S. National Museum.

Catonia sanctae-luciae sp. n.

(Fig. 103)

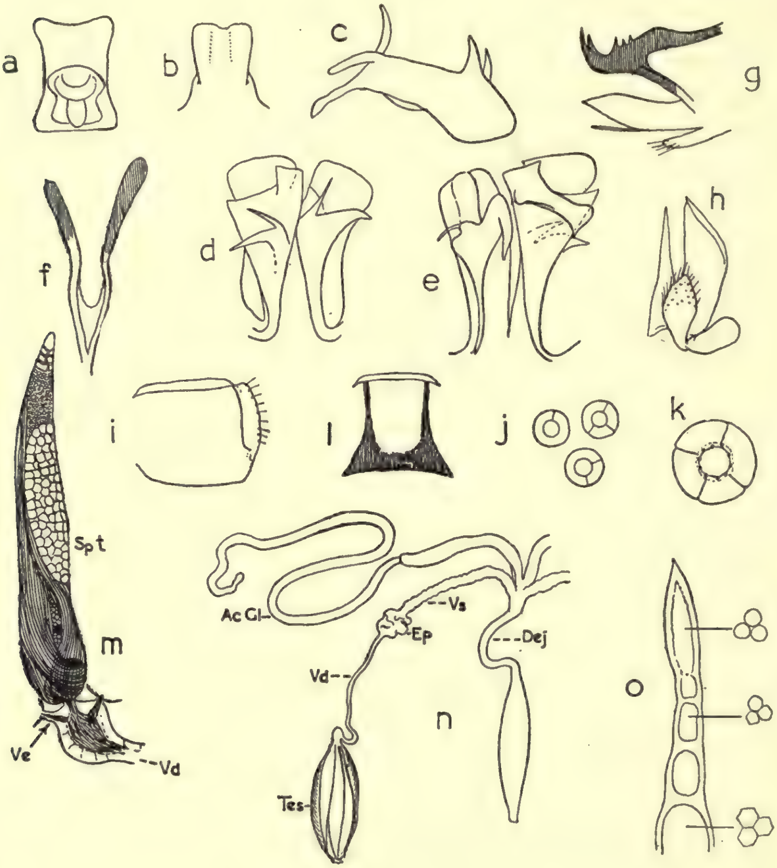

Fig. 103. *Catonia sanctae-luciae* sp. n.

a, anal segment of male; *b*, medioventral process of pygofer; *c*, right genital style; *d*, phallobase, ventral view; *e*, same dorsal view; *f*, phallic appendages; *g*, first valvula of ovipositor; *h*, female genitalia of right side; ventral view; *i*, third valvula; *j*, rings on surface of bursa; *k*, one of preceding, more highly magnified; ***l***, subvaginal plate; ***m***, spermatic tube (*Spt*), vas efferens (*Ve*), and basal end of vas deferens; ***n***, testis (*Tes*), vas deferens (*Vd*), epididymis (*Ep.*), vesicula seminalis (*Vs*), accessory gland (*AcGl*), and ductus ejaculatorius (*Dej*) (semidiagrammatic); *o*, apex of ovariole.

Male: length, 2·7 mm.; tegmen, 3·0 mm. Female: length 2·5 mm.; tegmen 3·5 mm.

Fuscous, speckled minutely with pallid spots; pale areas producing alternate bands of light and dark on sides of clypeus, legs, and costal cell of tegmina. Eyes red. Wings smoky.

Anal segment of male in dorsal view quadrate, apical margin shallowly excavate, smoothly deflexed through 90°. Pygofer ring-like, an incurved lobe on each side in dorsal view; medioventral process quadrate, 1·3 times as long as wide. Phallobase comprising a pair of broad horizontal lobes dorsally, that on right side with a sclerotized spine directed anteriorly, that on left with a small sclerotized knob; ventrally a pair of broad sclerotized unequal lobes, each bifurcated into two spinose processes. Aedeagal appendages strap-like, the shorter minutely pointed at apex. Genital styles narrow basally, distally subquadrate in profile, with a pair of pointed lobes on dorsal margin at apical third and a longer curved vertical spine arising on inner face near base.

Female with subvaginal plate subquadrate, about as long as broad across ventral margin. Ventral margin sclerotized, the sclerotic area extending inward for one-fifth of total length of plate; lateral margins concave, broadly sclerotized in lower half, narrowly sclerotized elsewhere. Ventral lobe of first valvulae elongate-rhomboidal, with an ovate lobe, as large as ventral lobe itself, attached on outer margin at its basal junction with body, surface of ventral lobe devoid of a crease. Bursa copulatrix ornamented with a close pattern of thick non-sclerotized rings.

Described from thirty-one males and twenty-nine females collected by the writer at Morne Lézard, Choiseul (14 May 1939), and in dry mountain forest on Morne Fortunée, Castries, St. Lucia, B.W.I. (September 1938, 18 August 1945, and on various dates between these). This species is distinguished in the male by the shape of the anal segment, the genital styles, and the phallobase and in the female by that of the subvaginal plate and of the ventral lobe of the first valvula and its attached lobe.

Catonia mitrata sp. n.

(Fig. 104)

Male: length, 3·2 mm.; tegmen, 3·1 mm. Female: length, 3·4 mm.; tegmen, 3·7 mm.

Vertex as broad across base as long in middle line, lateral margins very strongly raised, median carina present in basal two-thirds: frons at widest part 2·5 times as broad as at base. Tegmina with Sc+R forked two-fifths from base, Cu1b simple, cell Cu1b not divided distad of transverse vein. Wings with cell R1 with a distinct stalk before transverse vein.

Fuscous, uniformly speckled testaceous. Frons with lateral margins interrupted with about eight round testaceous spots; vertex with a Y-shaped pallid mark in middle line anteriorly with a short pale stripe on each side; a pale band across basal third of all tibiae and across middle of pro-femora. Tegmina pale fuscous, darker near stigma and in an oblique suffusion across middle of corium from basal quarter of costa to apex of anterior claval vein and thence to commissural margin, veins narrowly margined fuscous, interrupted with pallid spots.

Anal segment of male in dorsal view bilaterally symmetrical, lateral margins straight, parallel. Phallobase with two broad horizontal lobes dorsally, that of right side produced into a recurved pointed lobe at each apical angle, that of left into a single-pointed lobe directed obliquely laterad; ventrally a pair of T-shaped sclerotized limbs, each end of the transverse arm tapering to a point; aedeagal appendages strap-like, unequal, the shorter not pointed at apex, the longer dilated into a knob distally. Genital styles in profile narrow in basal portion, subquadrate distally, with two short pointed lobes on an eminence on dorsal margin, a long curved spine arising on inner face near base; near this, on dorsal margin, a short finger-like lobe. Pygofer with medioventral process quadrate.

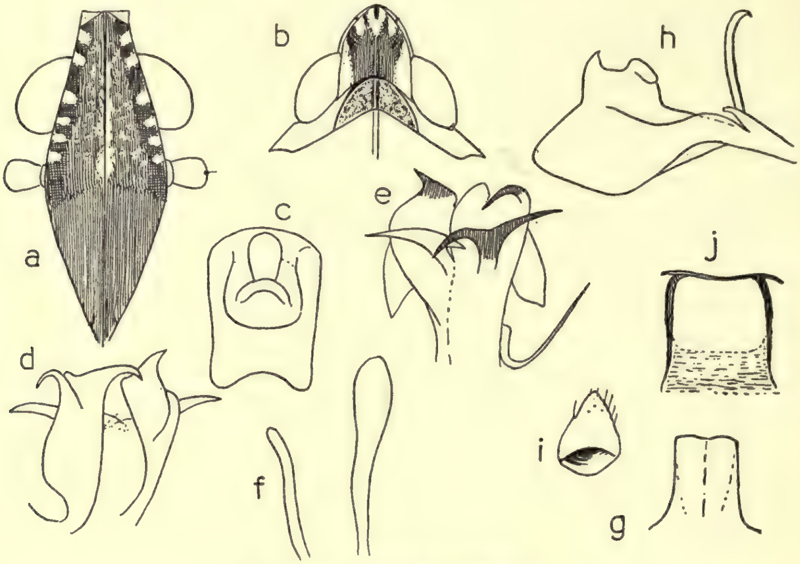

FIG. 104. *Catonia mitrata* sp. n.

a, frons and clypeus; *b*, vertex and pronotum; *c*, anal segment of male; *d*, phallobase, dorsa lview; *e*, same, ventral view; *f*, apex of phallic appendages; *g*, medioventral process of pygofer; *h*, left genital style; *i*, ventral lobe of first valvula of ovipositor; *j*, subvaginal plate.

Subvaginal plate quadrate, as broad along ventral margin as long, ventral margin and a broad band extending inward for one-third of total length of plate only moderately sclerotized and pigmented, lateral margins narrowly but heavily sclerotized and pigmented, dorsal margin only slightly less so. Ventral lobe of first valvula subtriangular, outer margin longer than inner, basal margin convex; a wide transverse lenticular excavation in basal quarter.

Described from three males and ten females collected by the writer at 800 ft. in mountain forest, Saltoun, Dominica, B.W.I. (5–11 June 1940). This species is readily distinguished by the proportions of the vertex and frons, by the coloration, and by the details of the genitalia in both sexes.

Catonia antiguana sp. n.

(FIG. 105)

Male: length, 2·7 mm.; tegmen, 3·0 mm.

Vertex broader across base than long in middle (1·2:1). Tegmina with Sc+R forking two-thirds from base, R almost anastomosing with M at M fork, Cu1 forking about middle of tegmen, ten apical areoles. Wings with cell R1 with a short stalk before R–M cross-vein, M2 branched, Cu1a branched, Cu1b simple.

Testaceous-fuscous, coarsely mottled stramineous. Tegmina with anterior half of costal cell pallid, mottled with pale spots; veins pale, corium slightly infuscate, speckled pallid, membrane fuscous, distinctly darker inside apical margin, veins pallid, the apical series distinctly interrupted with fuscous at middle. Wings fuscous.

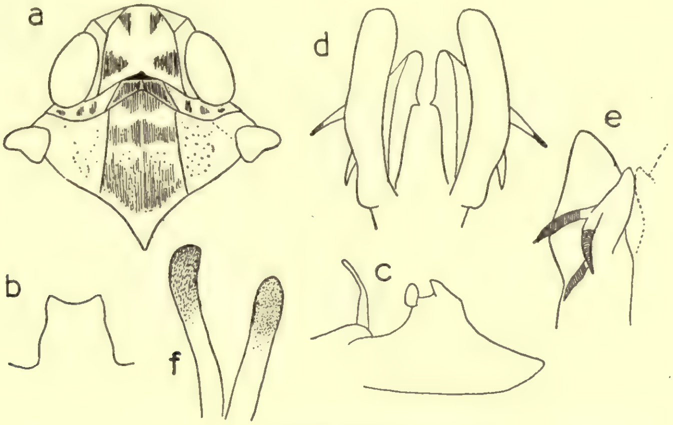

FIG. 105. *Catonia antiguana* sp. n.

a, vertex, pronotum and mesonotum; *b*, medioventral process of pygofer; *c*, left genital style; *d*, aedeagus, dorsal view; *e*, ventral view of apical portion of left half of aedeagus; *f*, phallic appendages at apex.

Anal segment in dorsal view broadest about one-quarter from base, margins converging distally to rounded apex. Pygofer with medioventral process subquadrangular, distal margin slightly excavate. Genital styles with ventral margin convex proximally and distally, concave in middle, apical margin obliquely truncate, dorsal margin with a pair of subspinose processes set on an eminence two-thirds from base, a long angulate finger-like process on inner face near base directed dorso-medially. Phallobase with a subspatulate lobe on each side dorsally, directed posteriorly, with an oblique sclerotized plate on each side of middle line in ventral half: each plate with a minute tooth directed mesad on dorsal margin and three long sinuate spines on ventral margin, the basal and distal directed antero-laterad, the middle directed anteriorly.

Described from one male collected by the writer in coast scrubland at Yepton's, Antigua, B.W.I. (21 November 1945).

Catonia major sp. n.

(FIG. 106)

Male: length, 3·7 mm.; tegmen, 3·8 mm. Female: length, 4·0 mm.; tegmen, 4·3 mm. Sc+R forking two-fifths from base, Cu forking at about same level, Cu1b branched at apex, cell R1 in wing with a short stalk before transverse vein.

Brown to fuscous-piceous; frons, genae, vertex, prothorax, and pleurites of thorax heavily speckled testaceous or ivory; mesonotum infuscate on anterior margin, with a pale well-defined subquadrate area, broader than long, on disk; remainder of disk, except basal margin, fuscous to piceous; lateral fields of mesonotum marbled pallid fuscous. Tegmina fuscous to piceous; costal cell pallid, traversed by 7–10 oblique piceous bands, three of which are broad: cell Sc and R and anterior half of cell M and vein Cu for a short distance basad of fork, a narrow triangle broadest at node and attaining apex of clavus, apex of longitudinal veins and transverse veins of membrane, pallid; all longitudinal veins with pallid speckling on each side: membrane fuscous.

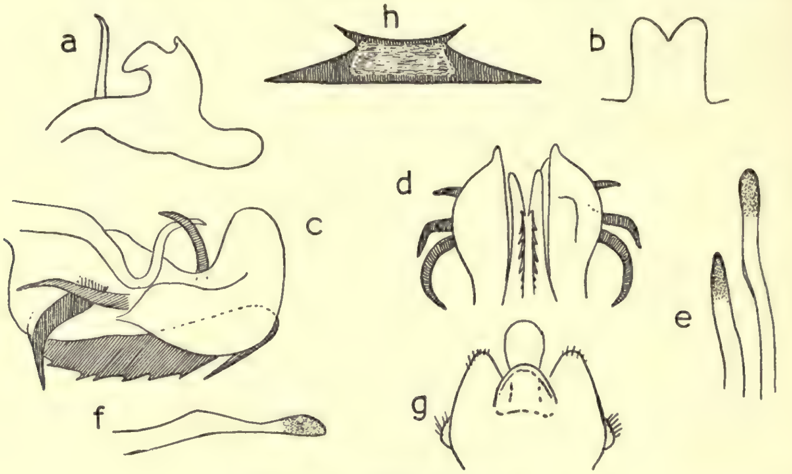

FIG. 106. *Catonia major* sp. n.

a, left genital style; *b*, medioventral process of pygofer; *c*, aedeagus, left side; *d*, same, ventral view; *e*, phallic appendages at apex; *f*, apex of one of phallic appendages in profile; *g*, anal segment of male; *h*, subvaginal plate.

Anal segment of male in dorsal view about as broad as long, excavate at apex, with a small lobe on each side one-third from base. Pygofer with medioventral process notched on apical margin. Phallobase in dorsal view with a pair of flat lobes, each with inner margin almost straight, outer margin convex, distally ending in a point; ventrolaterally, an oblique sclerotized plate on each side with six small recurved teeth and one recurved spine on dorsal margin, three long spines laterally, the basal spine sinuate, directed dorsad, the second directed laterad and bent cephalad in its apical third, the third arising near base and curving upward, then downward and mesad, crossing the middle line. Aedeagal appendages unequal. Genital styles with ventral margin sinuate, apical margin very oblique, dorsal eminence prominent, with two lobes; a long vertical spine arising on inner face of style near base, directed mesad.

Female with subvaginal plate longer on ventral than on dorsal margin (2:1), lateral margins oblique, strongly excavated near dorsal end. Lobe of first valvulae bluntly triangular, as broad across base as long, devoid of a lobate expansion at base.

Described from one male taken by the writer in Christian Valley, Antigua, B.W.I. (2 April 1944), and one female taken at Yepton's, Antigua, on *Malpighia* (10 December 1945).

Catonia digitalis sp. n.

(FIG. 107)

Female: length, 4·5 mm.; tegmen, 4·8 mm.

Median length of vertex slightly less than width across base.

Reddish-brown to fuscous, with head, thorax, and tegmina uniformly and evenly speckled with very minute pallid spots, legs not marked with pallid. Wings smoky brown.

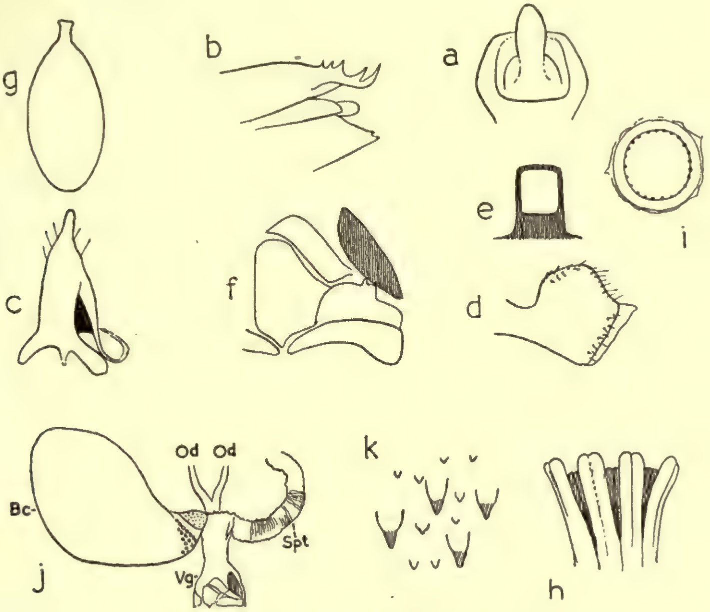

FIG. 107. *Catonia digitalis* sp. n.

a, anal segment of female; *b*, first valvula of ovipositor, left side; *c*, ventral lobe of first valvula; *d*, third valvula; *e*, subvaginal plate; *f*, dorsal view of sclerites in wall of vagina; *g*, egg; *h*, processes at micropilar pole of egg (artificially drawn apart); *i*, ring on surface of bursa copulatrix; *j*, vagina (*Vg*), spermatheca (*Spt*), bursa copulatrix (*Bc*), and lower portions of oviducts (*Od*); *k*, ornamentation on sclerite at entrance to bursa copulatrix.

Subvaginal plate quadrate, about 1·4 times as long as broad across ventral margin, ventral margin strongly sclerotized, the sclerotized area extending inward for about a third of length, lateral margins sclerotized, dorsal margin weakly sclerotized. Ventral lobe of first valvula elongate-triangular, produced at base into a finger-like lobe on inner margin and two spatulate lobes on outer face; a deep cleft between these lobes. Genital chamber with a sclerotized and pigmented ovate plate dorsally on right side. Bursa copulatrix with a subtriangular pigmented shagreen area at base, the minute spicules of this area conical, irregular, and of two sizes; remainder of bursa copulatrix ornamented with delicate sclerotized rings, each with a narrow rim and minutely tuberculate on inner circumference.

Described from two females collected by the writer at 1,000 ft. in mountain forest near Saltoun, Dominica, B.W.I. (June 1940). This species is very distinct, both on account of its size, sombre coloration, and ornamentation of the genitalia. In size, in the presence of a deep cleft on the ventral lobe of the first valvulae, and in the deep sclerotized band along the ventral margin of the subvaginal plate this species would appear to be most nearly related to *Catonia intricata* Uhl. from St. Vincent.

Catonia dominicana sp. n.

(FIG. 108)

Male: length, 3·5 mm.; tegmen, 3·8 mm.

Sc+R forking just basad of middle of tegmen, Cu forking more distad, Cu1b simple to apex; cell Cu1b not divided. Wings with cell R1 with a very short stalk beyond transverse vein.

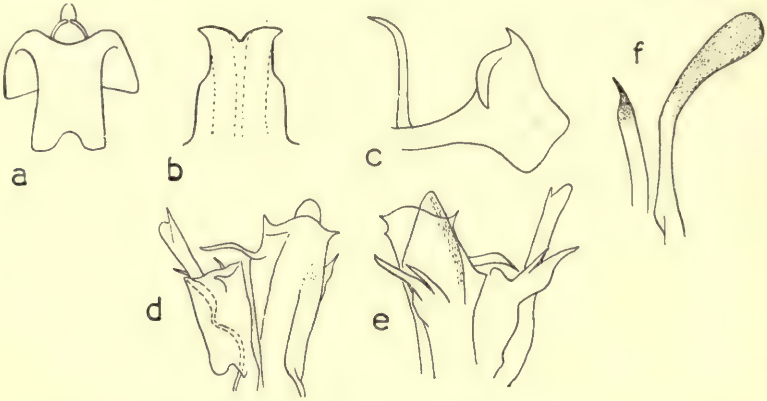

FIG. 108. *Catonia dominicana* sp. n.

a, anal segment of male; *b*, medioventral process of pygofer; *c*, left genital style; *d*, aedeagus, dorsal view; *e*, same, ventral view; *f*, phallic appendages at apex.

Pale fuscous, so heavily speckled with pale spots as to appear testaceous; clypeus wholly pale anteriorly; pro- and meso-tibiae with a broad pallid band across middle. Tegmina yellowish-brown, translucent, fuscous on membrane distad of stigma and in a subapical band interrupted by apical veins.

Anal segment of male bilaterally symmetrical, deflexed through 90° in distal half; lateral margins parallel in basal half; anal foramen situated in distal half, apical margin strongly convex. Pygofer with two unequal lobes on each lateral margin; medioventral process subquadrate with lateral margins concave distally, apical margin broadly notched. Phallobase with a pair of unequal horizontal lobes dorsally, that of left side longer and provided on inner face towards apex with a sinuate spine directed laterad across middle line, apical margin of lobe produced into a short tooth at each end; lobe of right side three-quarters of length of preceding, with a short curved tooth near inner apical angle, apical margin sinuate-truncate; ventrally a pair of sclerotized laminae each curved outward and forking in distal third, the limbs of each fork almost parallel, not diverging. Aedeagal appendages strap-like, the longer angulate one-third from base, the shorter pointed at apex. Genital styles in profile narrow basally, subquadrate in distal half, dorsal margin with a pair of spinose processes on an eminence one-quarter from apex, the distal process stout, directed upward, the proximal process long, curved outward and downward, a long spine arising on inner face of style near base directed dorsally and curved mesally at tip.

Described from one male taken by the writer at 1,000 ft. in mountain forest near Saltoun, Dominica, B.W.I. (18 June 1939), on *Miconia* sp. This species is the Dominican counterpart of *C. sancti-vincenti*, from which it differs very markedly in the shape of the anal segment, lobes and processes of the phallobase, aedeagal appendages, distal processes and basal spine of genital styles, lateral margins and medioventral process of pygofer. The extent of these differences can best be appreciated from the figures.

Catonia montserratensis sp. n.

(Fig. 109)

Female: length, 3·0 mm.; tegmen, 3·4 mm.

Vertex broader across base than long in middle (1·2:1). Tegmina with Sc+R forking at middle of tegmen, Cu forking very slightly distad of middle, Cu1b simple to apex. Wings with cell R1 not stalked beyond transverse vein.

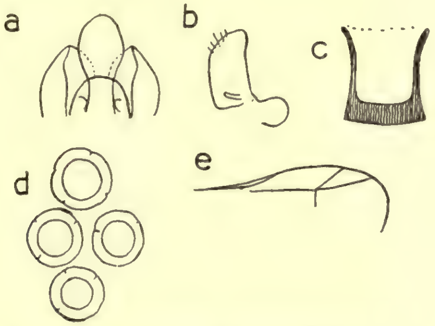

Fig. 109. *Catonia montserratensis* sp. n.

a, anal segment of female, dorsal view; ***b***, ventral lobe of first valvula of ovipositor; ***c***, subvaginal plate; ***d***, ornamentation on surface of bursa copulatrix; ***e***, apex of wing.

Fuscous, heavily speckled testaceous; pronotum laterally pale on interareolar ridges; mesonotum almost uniformly fuscous, speckled ivory-testaceous; tibiae pallid basally, near middle, and distally. Tegmina semitransparent, testaceous; seven rounded spots along costal margin, stigma and elongate suffusions or rounded spots interrupting all longitudinal veins, fuscous, speckled pallid; membrane with a faint arcuate suffusion just distad of transverse line and a fuscous band, interrupted by the apical veins, adjoining margin.

Anal segment of female in dorsal view with anal style spatulate. Subvaginal plate subquadrate, not quite as broad along ventral margin as long, ventral margin sclerotized, the sclerotized band extending upward for a fifth of total length of plate; lateral margins strongly but narrowly sclerotized, shallowly concave, dorsal margin not sclerotized. Ventral lobe of first valvulae short, inner and apical margin forming a single curve, outer margin straight, concave near apex, a prominent semicircular lobe adjoining ventral lobe laterally at base. Bursa copulatrix ornamented with closely-set weakly-sclerotized rings.

Described from one female collected by the writer at 1,300 ft. on Chances Mountain, Montserrat, B.W.I. (12 May 1940), in forest. This species is distinguished by the position of the Sc+R fork in the tegmen, the stalkless condition of cell R1 in the wing, by the shape of the anal style, subgenital plate, and ventral lobe of first valvulae. and by the coloration. The species is apparently endemic in Montserrat.

Catonia sobrina (Fowler)

(Fig. 110)

1904. *Helicoptera sobrina* Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**: 106, pl. 11, fig. 14, *a*.

Frons and clypeus infuscate; a transverse band across middle of frons, three spots above and three spots or short oblique bars below it on each lateral margin, a spot at base of median carina of clypeus and three spots on each margin pallid; areas between marginal spots of frons piceous-fuscous.

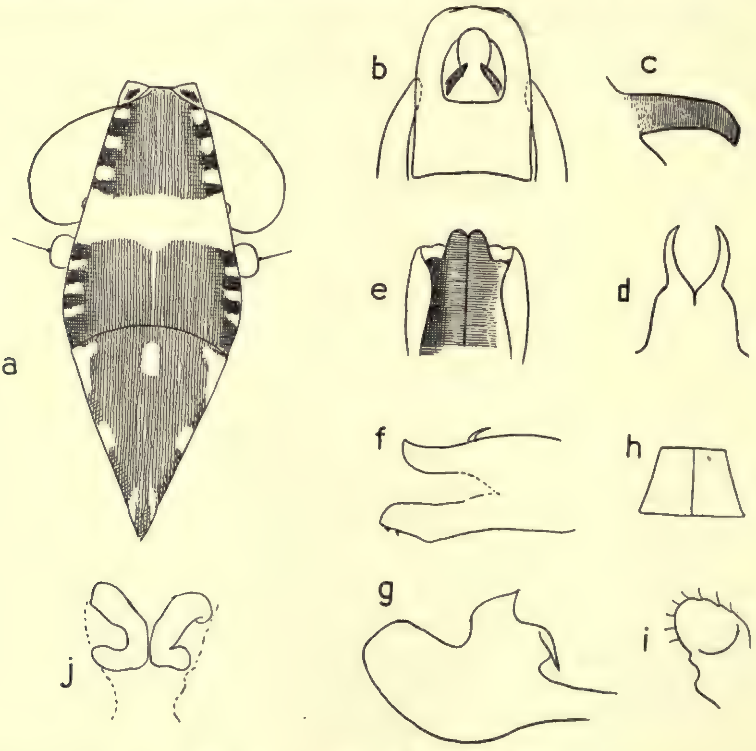

Fig. 110. *Catonia sobrina* (Fowler).

a, frons and clypeus; *b*, anal segment of male; *c*, process on hind margin of pygofer dorsolaterally; *d*, medioventral process of pygofer; *e*, aedeagus dorsal view; *f*, same in profile (semi-diagrammatic); *g*, right genital style; *h*, subvaginal plate; *i*, ventral lobe of first valvula of ovipositor; *j*, sclerites in vagina.

Anal segment of male longer than broad (1·4:1), foramen in distal half. Pygofer produced on each side into a moderately long process decurved at apex; medioventral process comparatively long, bifid in distal half with each limb curved. Genital styles narrow basally, in profile ventral margin convex, apical margin broadly rounded, dorsal margin excavate in apical half with a broad vertical plate directed dorsad, its upper angles pointed or spinose. Aedeagus in lateral and dorsal views as figured.

Subgenital plate of female trapezoidal, ventral margin less than twice height in middle, sides straight. Ventral lobes of first valvulae sinuate on inner margin, broadly rounded apically, outer margin oblique, a depression near middle of lobe bounded basally by an arcuate rim. Bursa copulatrix ornamented at its inner end with a large ovate sclerotized plate beset with short spines directed obliquely mesad, the spines in the vaginad third much longer than the remainder; general surface of bursa beset uniformly with minute rings; vagina not armed with sclerites.

This supplementary description is based on the type and closely corresponding paratypes. The various species in the British Museum standing under *Helicoptera sobrina* in the Biologia series may readily be separated by the colour-pattern of the frons and clypeus.

Catonia albidovariegata (Fowler)

(FIG. 111)

1904. *Helicoptera sobrina* var. *albidovariegata* Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**: 107.

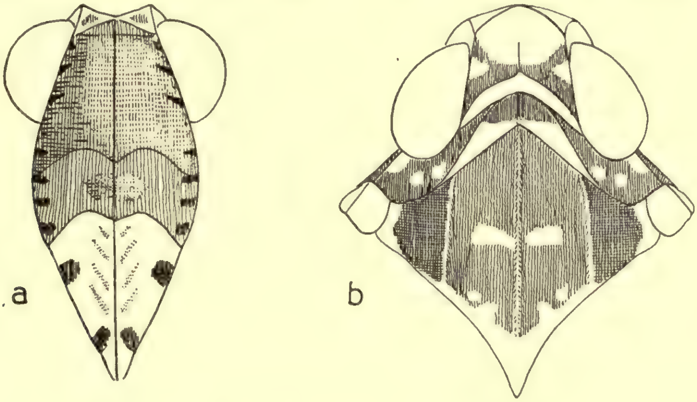

FIG. 111. *Catonia albidovariegata* (Fowler).
a, frons and clypeus; *b*, vertex, pronotum, and mesonotum.

Female: length, 4·5 mm.; tegmen, 5·0 mm.

Fuscous; latero-apical areolets, distal half of vertex, a spot in middle of each lateral margin of vertex, a pair of triangular areas on posterior half of pronotal disk, two small round spots on pronotum behind eye and a larger spot on lateral marginal carina, tegulae, and mesonotum near tegulae and posterior margin of mesonotum, pallid; a spot on each side of median carina at middle of disk and a small spot behind it near scutellum testaceous; frons orange-fawn in basal two-thirds, a broad band, with basal margin correspondingly parallel to the sinuate fronto-clypeal suture, distinctly darker, a transverse ovate area in its middle paler, lateral margins with eight fuscous-piceous spots, distally extending slightly mesad to form short bars; clypeus rather pale with two dark spots on each margin.

This supplementary description is based on one female collected by Champion at 5,000 ft., Panajachel, Guatemala, and one between 2,000 and 3,000 ft. on Volcán de Chiriquí, Panama.

Catonia chiriquensis (Fowler)

(Fig. 112)

1904. *Helicoptera chiriquensis* (pars) Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**:107, pl. 11, fig. 16, *a*.

Male: length, 4·0 mm.; tegmen, 4·3 mm. Female: length, 4·2 mm.; tegmen, 4·9 mm.

Frons and clypeus pallid yellow or ochraceous; a small spot in each latero-apical facet on vertex, about nine small spots along each lateral margin of frons, a spot on fronto-clypeal suture at margin, margins of clypeus except near base and for a little distance mesad, fuscous-piceous.

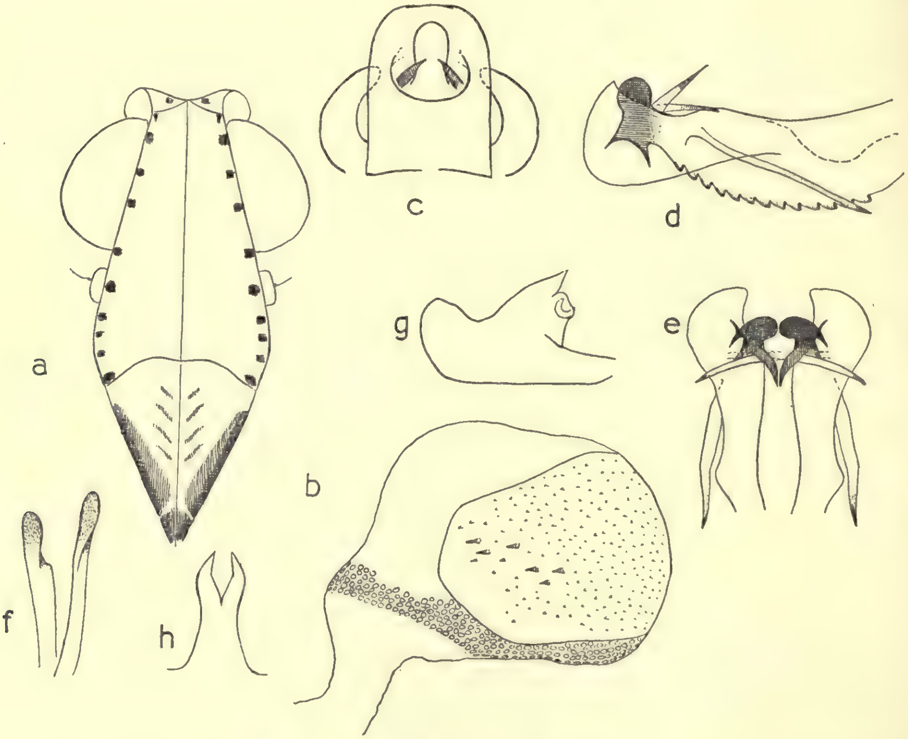

Fig. 112. *Catonia chiriquensis* (Fowler).

a, frons and clypeus; *b*, bursa copulatrix; *c*, anal segment of male; *d*, aedeagus, lateral view; *e*, same, dorsal view; *f*, phallic appendages at apex; *g*, right genital style; *h*, medioventral process of pygofer.

Anal segment of male not twice as long as broad, rounded apically, anal foramen in distal half. Pygofer with each lateral margin produced into a moderately long lobe, tapering distally, rounded at apex, medioventral process about 1·5 times as long as broad across base, bifid distally, each limb slightly incurved. Genital styles in profile narrow basally, ventral margin straight, apical margin rounded, dorsal margin concave, with a large subtriangular vertical process tapering to a point at apex with a second curved spinose process adjoining at a lower level. Phallobase bilaterally symmetrical, armed as shown in figures.

Bursa copulatrix furnished at inner end with a large round pigmented sclerotized plate bearing many minute spines irregularly scattered, four to six of these spines near the lower end distinctly larger than the remainder, conspicuous but scarcely more than twice as long as broad at base; general surface of bursa beset uniformly with minute rings. Vagina not furnished with sclerites.

Described from one male taken at 1,700 ft., Pantaleon, Guatemala, one female between 800 and 1,500 ft. at Bugaba, and a second female (the type) between 2,500 ft. and 4,000 ft. on Volcán de Chiriquí, Panama, collected by Champion. Type in Brit. Mus. (N.H.).

Catonia sancti-geronimi sp. n.

(FIG. 113)

1904. *Helicoptera sobrina* (pars) Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**: 106.

Female: length, 3·9 mm.; tegmen, 4·2 mm.

Fuscous, spotted and marbled pallid; frons and clypeus fuscous, carinae of latero-apical aerolets of head, eight spots or short oblique bars on lateral margins of frons, a large spot at middle and a smaller near apex of median carina of frons, one or two small spots on distal third of disk, most of clypeus adjoining fronto-clypeal suture, a spot on median carina of clypeus at base and near apex, and a spot in middle of lateral margins of clypeus, pallid; median carina of frons testaceous, apex of clypeus fuscous. Tegmina dull grey, alternated with fuscous along costal margin and on veins; a spot between Cu2 and first claval vein at indentation of latter and a broad curved irregular band from stigmal cell to fork of Cu1a, fuscous.

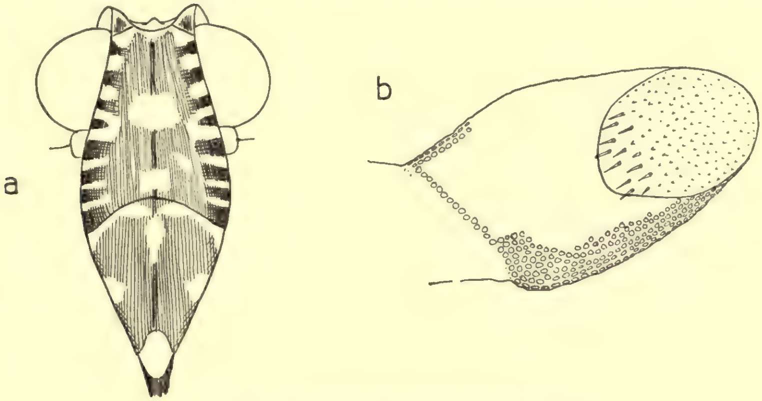

FIG. 113. *Catonia sancti-geronimi* sp. n.
a, frons and clypeus; *b*, bursa copulatrix (much of surface ornamentation omitted).

Bursa copulatrix ornamented at its inner end with a large ovate sclerotized plate beset with short spines directed obliquely mesad, about a dozen spines in the vaginad quarter much longer than remainder; general surface of bursa beset uniformly with minute rings; vagina not armed.

Described from one female taken by Champion at 3,000 ft., San Gerónimo, Guatemala. Type in Brit. Mus. (N.H.). The species is distinguished by the markings on the frons and by the form of the spines on the sclerite in the bursa copulatrix.

Catonia bugabae sp. n.

(FIG. 114)

1904. *Helicoptera sobrina* (pars) Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**: 106.

Male: length, 4·0 mm.; tegmen, 4·2 mm.

Stramineous, marked testaceous-fuscous; vertex stramineous with two testaceous-brown spots on each side, frons testaceous, carinae of latero-apical areolets, three spots on basal third of each lateral margin of frons, a moderately broad shallowly Λ-shaped band across frons near basal third, two spots on each margin and a short transverse bar across median carina distad, latero-apical fields of frons except for four spots on margin, pallid; pronotum testaceous. Tegmina testaceous-brown, infuscate between apex of clavus and stigma, and in an irregular band from basal margin of clavus between R and Cu to Cu1b at apex of clavus, costal cell pale. Wings smoky, veins concolorous.

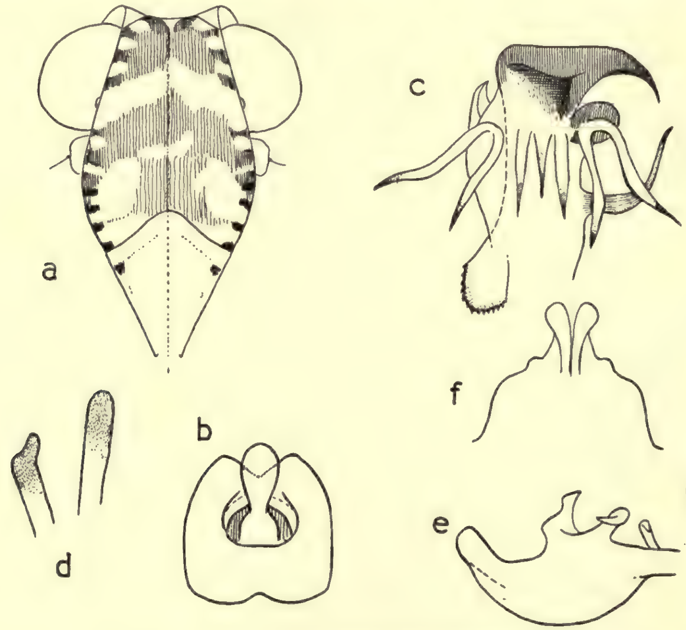

FIG. 114. *Catonia bugabae* sp. n.

a, frons and clypeus; *b*, anal segment of male; *c*, aedeagus; *d*, phallic appendages at apex; *e*, right genital style; ,medio-ventral process of pygofer; *g*, dorsal view of spinose process at base of genital style.

Anal segment of male about as broad as long, apical margin rectangulately incised. Pygofer with medio-ventral process bifid in apical portion, each limb much longer than broad at apex, moderately broad and slightly curved laterad at apex, so that distal margin is oblique. Genital styles in profile narrow basally, ventral margin convex, apical margin rounded, dorsal margin concave with a pair of broad tapering processes near middle, one directed anterodorsad at apex, the other mesad, a curved spine on inner face of styles near base. Phallobase as shown in figures.

Described from one male labelled "*Helicoptera sobrina* Fowl." taken by Champion between 800 and 1,500 ft. at Bugaba, Panama. This species bears a general resemblance to *Catonia pallidistigma* Fennah from Trinidad, B.W.I., but differs in the markings on the distal half of the frons.

Catonia zunilana sp. n.

(FIG. 115)

1904. *Helicoptera sobrina* (pars) Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**: 106.

Male: length, 4·0 mm.; tegmen, 5·0 mm.

Colour as in *bugabae*, but markings generally paler in holotype.

Stramineous, mesonotum testaceous; two clouds on disk of frons testaceous; eight or nine spots on each lateral margin of frons, a spot in each latero-apical areolet of head, two on each lateral margin of vertex, and one in each depression of pronotum, fuscous, usually small. Tegmina cinereous, an area at stigma, and apical areoles infuscate, veins cinereous interrupted by transverse fuscous bars.

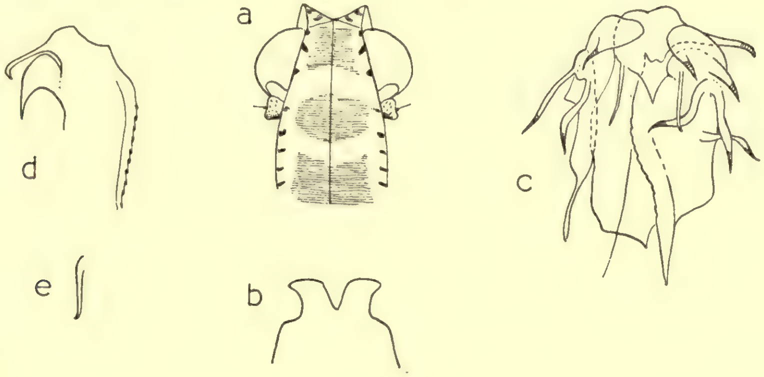

FIG. 115. *Catonia zunilana* sp. n.

a, frons; *b*, medio-ventral process of pygofer; *c*, aedeagus; *d*, ventral view of distal processes on left side of aedeagus; *e*, dorsal view of spinose process at base of genital style.

Anal segment as in *bugabae*. Pygofer with medio-ventral process bifid in apical portion, each limb scarcely longer than broad at apex, apical margin of each transverse, or nearly so, exterior apical angle produced laterad. Genital styles generally as in *bugabae*, but spine on inner face near base (Fig. 115, *e*) much smaller and more slender than that in *bugabae*. Phallobase as shown in figures.

Described from one male collected by Champion between 4,000 and 5,000 ft., Cerro

Zunil, Guatemala. This species is close to *bugabae* but differs in the lighter markings, in the shape of the medio-ventral process of the pygofer, of the spine near the base of the genital styles, and in the proportions and shape of the spines and process on the phallobase. Type in Brit. Mus. (N.H.).

Catonia championi sp. n.

(FIG. 116)

1904. *Helicoptera sobrina* (pars) Fowler, *Biol. cent.-Amer. Rhynch. Hom.* **1**:106.

Male: length, 3·2 mm.; tegmen, 3·8 mm. Female: length, 4·6 mm.; tegmen, 5·1 mm.

Testaceous, marked with fuscous; frons testaceous darkening to fuscous at lateral margins, seven small spots or short transverse bars on lateral margins, a rhomboidal spot at middle of median carina and a triangular spot at its apex, pallid; clypeus testaceous, an oblique bar adjoining each laterad third of fronto-clypeal suture, two spots at margins in apical half pallid; pronotum fuscous-piceous, a pallid spot near each lateral carina of disk anteriorly and posteriorly.

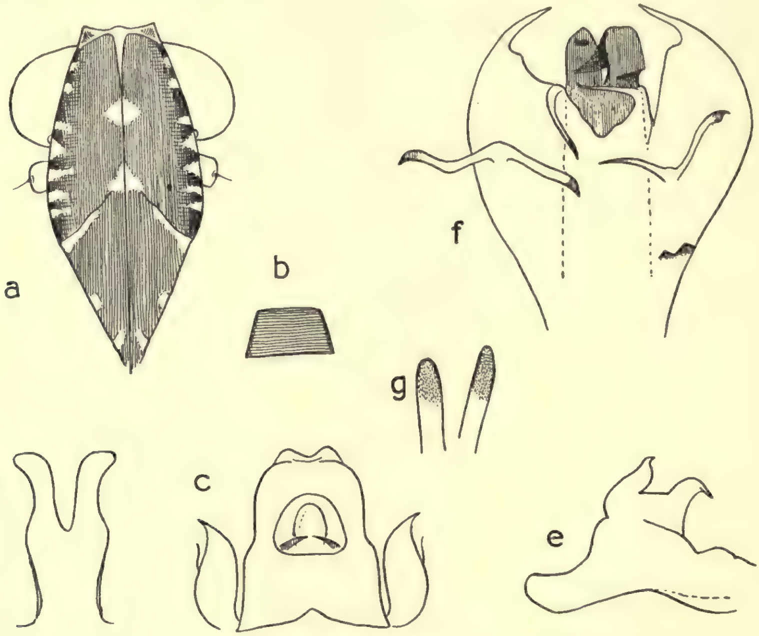

FIG. 116. *Catonia championi* sp. n.

a, frons and clypeus; *b*, subvaginal plate; *c*, anal segment of male and dorso-lateral lobes of pygofer; *d*, medio-ventra process of pygofer; *e*, right genital style; *f*, aedeagus, dorsal view; *g*, phallic appendages at apex.

Anal segment of male fully as long as broad, apical margin sinuate, concave at middle. Pygofer produced on each side in a short broad lobe tapering distally, medio-ventral process deeply bifid in distal half, each limb almost three times as long as broad at apex, apical margin truncate-convex, outer apical angle slightly produced laterad. Genital styles similar to those of *bugabae*. Phallobase as shown in figures.

Female with subvaginal plate trapezoidal, dorsal margin two-thirds length of ventral, lateral margins oblique.

Described from the following series collected by Champion: one male, 2,500–4,000 ft., Volcán de Chiriquí; five females, 8,000 ft., Volcán de Chiriquí, Panama; Cubilguitz, Vera Paz; San Joaquin, Vera Paz; San Juan, Vera Paz; San Gerónimo, Guatemala. Type in Brit. Mus. (N.H.). This species is distinguished by the markings on the frons, by the shape of the hind margin of the anal segment, and by that of the armature of the phallobase.

Catonia muscosa sp. n.

(Fig. 117)

Male: length, 4·1 mm.; tegmen, 4·5 mm.

Brown to fuscous; two spots at anterior angles of vertex, two spots on median carina of frons, a series of spots along lateral margins, two spots on clypeus at fronto-clypeal suture, carina and parts of intercarinal spaces on pronotum, testaceous to pallid; mesonotum fulvous. Tegmina with corium light brown, veins of corium and their lateral granulation nile-green, membrane fuscous, veins pallid with pale granules. Wings smoky, veins concolorous or darker.

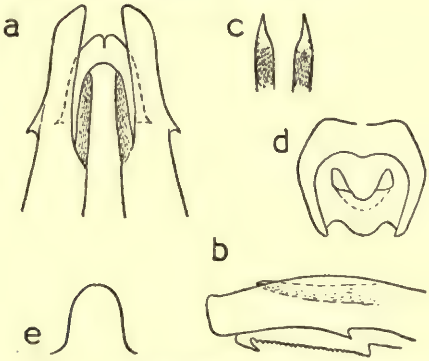

Fig. 117. *Catonia muscosa* sp. n.

a, aedeagus, dorsal view; *b*, same, lateral view; *c*, phallic appendages at apex; *d*, anal segment; *e*, medio-ventral process of pygofer.

Anal segment very short, slightly broader than long, mostly occupied by anal foramen, apical margin bisinuately excavate. Pygofer with medio-ventral process entire, about 1·5 times as long as broad at base, apical margin strongly convex. Phallobase as shown in figures, with paired shagreen tapering dorsal sclerites, and paired serrated ventral sclerites decurved in a reflexed point at apex; aedeagal appendages both tapering at apex to a slender point.

Described from one male collected by G. A. Hudson at Kutari Sources, British Guiana (Jan.–Feb. 1936; Brit. Mus. 1936–360). Type in Brit. Mus. (N.H.). This species is distinguished by the green veins on the brown corium and by the shape of the anal segment, medio-ventral process on the pygofer, and the armature of the phallobase.

Catonia moraballi sp. n.

(Fig. 118)

Male: length, 3·0 mm.; tegmen, 4·5 mm.

Testaceous and pallid green; vertex, except for two spots anteriorly and basal lateral angles, a suffusion on side of head above eyes, a series of about ten spots on each lateral margin of frons, distal half of clypeus, broad transverse bars on pro- and mesocoxae, femora and tibiae, and a narrow band near apex of post-tibiae, fuscous. Tegmina pallid yellowish-green, an oblique band across middle of clavus, another from middle of M to apex of clavus, a spot in cell R at level of M fork, distal portion of subapical cell Cu1a and apical cells of Sc, R, and M fuscous. Veins of corium green all veins studded with pallid granules or short peg-like lateral outgrowths. Wings moderately infuscate, veins darker.

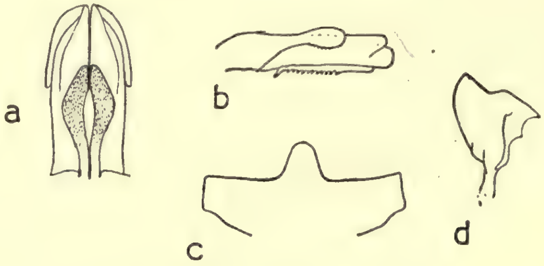

Fig. 118. *Catonia moraballi* sp. n.
a, aedeagus, dorsal view; *b*, same, lateral view; *c*, posterior margin of pygofer; *d*, left genital style, ventral view.

Anal segment short. Pygofer with medio-ventral process entire, about as long as broad at base, apical margin strongly convex. Phallobase as shown in figures, dorsal shagreened sclerites expanding distally to assume a subspatulate form, paired serrated ventral sclerites not decurved distally in a spine.

Described from two males collected by the Oxford University Expedition at Moraballi Creek, Essequibo River, British Guiana (15–16 Sept. 1929; Brit. Mus. 1929–485; 18 Sept. 1929; Brit. Mus. 1929–485). Type and paratype in Brit. Mus. (N.H.). This species is evidently close to *muscosa*, but differs in coloration and in the shape of the armature of the phallobase.

Catonia (Pyren) saltator sp. n.

(Fig. 119)

Male: length, 3·4 mm.; tegmen, 4·0 mm. Female: length, 3·9 mm.; tegmen, 4·0 mm.

Vertex fully twice as broad as long in middle line; frons at widest part about 1·6 times width at base. Tegmina with nine apical areoles distad of stigma, apical areoles in M slightly longer than one-third of longest subapical areole in M.

Yellowish-brown with paler speckling; apex of clypeus, a spot on genae above eyes, a spot in each half of vertex, pronotum except carina, legs, and abdomen, fuscous, mesonotum pale testaceous or fuscous, heavily speckled yellowish-brown and with a yellowish-brown area on each side of middle line anteriorly.

Anal segment of male in dorsal view broad, tapering distally, broadly rounded at apex. Pygofer with medio-ventral process quadrate, produced laterad at distal angles, apical margin transverse, medially cleft. Phallobase suspended by a pair of S-shaped sclerotized rods; dorsally hollowed out longitudinally, with a long triangular sclerite on each side of middle line, each sclerite subtriangular in profile and bearing two minute teeth and a stout spine; phallobase ventro-laterally formed of a sclerite which is narrow basally and broadens distally to end in three spines; mesad of this sclerite a more delicate lobe, rounded distally, with a short spine directed ventrally. Aedeagal appendages strap-like, unequal, both rounded at apex, a long slender membranous filament extending caudad between them. Genital styles narrow basally, distally expanded with a pair of pointed lobes on dorsal margin near middle and a long curved subvertical spine arising on inner face near base.

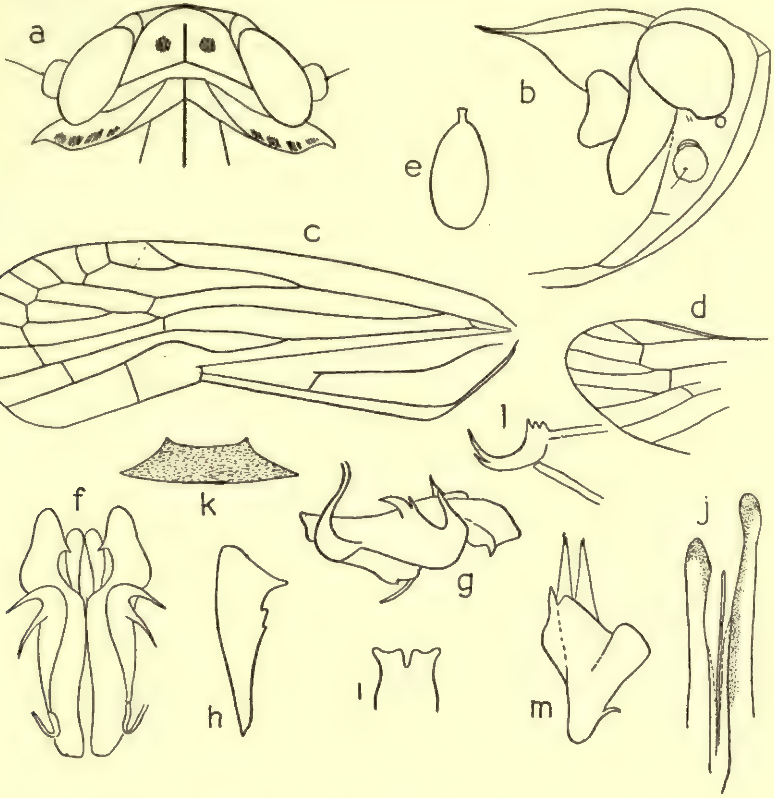

FIG. 119. *Catonia* (*Pyren*) *saltator* sp. n.

a, vertex and pronotum; *b*, head and thorax in profile; *c*, tegmen; *d*, apex of wing; *e*, egg; *f*, aedeagus, dorsal view; *g*, same, lateral view; *h*, one of dorsal sclerites of aedeagus, dorsal view; *i*, medio-ventral process of pygofer; *j*, phallic appendages; *k*, subvaginal plate; *l*, first valvula of ovipositor, lateral view; *m*, ventral lobe of first valvula.

Female with subvaginal plate fully three times as broad as long, ventral margin about 1·8 times as long as dorsal, lateral margins oblique and concave. Ventral lobes of first valvulae of ovipositor triangular in ventral view, each furnished with a subspinose limb which is separate except at base; first valvulae with three small subequal teeth closely grouped on dorsal margin and a pair of longer but unequal spines distally. Bursa copulatrix uniformly beset with thin-walled rings, a subspatulate tract extending from near entrance for a third of circumference of bursa minutely shagreened.

Described from 9 males and 12 females taken by the writer at 800 ft. in mountain forest near Sherwood Estate, Dominica, B.W.I. (17 June 1940). This species is distinguished by the proportions of the head and the shape of the genitalia in the male and the ornamentation of the bursa copulatrix in the female.

ADDENDUM

ZATHAUMA Fennah

1949. *Zathauma* Fennah, *Ann. Mag. Nat. Hist.* (12) **2**:605. Type-species, *Zathauma cristatum* Fennah.

Zathauma runs to *Phypia* or *Spino* in the key to plectoderine genera, but differs from both in the markedly convex lateral discal pronotal carinae.

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A REVISION OF THE FAMILY CERACIDAE

(LEPIDOPTERA TORTRICOIDEA)

A. DIAKONOFF

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LONDON : 1950

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Pp. 171–219; 34 *Text-figures*

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A REVISION OF THE FAMILY CERACIDAE (LEPIDOPTERA, TORTRICOIDEA)

By A. DIAKONOFF

SYNOPSIS

The author proposes to re-establish Meyrick's family Ceracidae as an independent member of the superfamily Tortricoidea. From a study of a considerable amount of material the group is revised and a new genus, eight new species, and ten new subspecies are described.

SEVERAL authors who dealt with the conspicuously coloured large moths of the genus *Cerace* and its allies were puzzled by their appearance and characters and could reach no agreement upon the true position of these insects within the Microlepidoptera. Consequently Walker and Moore, who were the first to recognize the true Tortricoid relationship of *Cerace*, put this genus in the family Tortricidae; Snellen thought it to be a Tineid; Meyrick regarded *Cerace* originally as belonging to Plutellidae, founded the family Ceracidae afterwards, but later on suppressed it again and placed *Cerace*, together with *Pentacitrotus* (which he regarded only as a synonym), in the Tortricidae. The latter genus was described by Butler as belonging to Lithosiidae; Warren was of the same opinion. Later on Filipjev described the genus *Eurydoxa* as a Tortricid, of which Matsumura's *Ceraceopsis* is a new synonym.

Originally the author shared Meyrick's opinion and regarded *Cerace* and *Pentacitrotus* as belonging to the family Tortricidae but separated them in a subfamily, for which he proposed the name of Ceracidii. Further study convinced him, however, that this situation could not be maintained. In the present paper he proposes to re-establish Meyrick's family Ceracidae, which represents a very distinct, natural group of insects, being a quite independent member of the superfamily Tortricoidea.

A considerable amount of material, which has been put at the author's disposal by the authorities of the British Museum (Natural History), supplemented by some specimens from the Leiden Museum and the Muséum National d'Histoire Naturelle in Paris, from the collection of Mr. T. Bainbrigge Fletcher, and from the author's own collection, enabled him to revise the present group. A new genus, eight new species, and ten new subspecies are described. One species is re-established and one abandoned. Three species, viz. *Cerace loxodes* Meyrick and *C. mesoclasta* Meyrick, of which the types possibly are in the Indian Museum, Calcutta, and *Eurydoxa advena* Filipjev, of which the type is in the Museum of the Leningrad Academy of Sciences, could not be studied at present.

The author is greatly obliged to the authorities of the British Museum, and of the Leiden and Paris Museums, for the loan of valuable material, and also to Mr. W. H. T. Tams, British Museum, for his kind help and information, and also for the photographs of type specimens at that museum and to Mr. T. Bainbrigge Fletcher, Stroud, England, for valuable information on literature and for the loan of the material from his collection.

KEY TO THE FAMILIES OF TORTRICOIDEA

1. Basal segment of antenna without pecten 2
   Basal segment of antenna with pecten . . . . . MELANALOPHIDAE
2. Head smooth; flattened tuft on vertex encircling base of antennae which are approximated; eyes protruding; palpi porrect, little dilated, terminal segment very short . . . . CERACIDAE
   Head with appressed scales; if rather smooth then palpi dilated posteriorly with rough projecting scales above and beneath or palpi long 3
3. Fore wing with vein 2 from beyond ¾ of cell . . . . . PHALONIIDAE
   Fore wing mostly with vein 2 from before ¾ of cell[1] 4
4. Hind wing with basal pecten of hairs on lower margin of cell . EUCOSMIDAE
   Hind wing mostly without such pecten[2] 5
5. Fore wing with veins 8 and 9 stalked or coincident; hind wing with vein 5 parallel, 6 and 7 stalked . . . . CHLIDANOTIDAE
   Fore wing with veins 8 and 9 rarely stalked; if thus, then hind wing with vein 5 approximated to 4 at base . . . . TORTRICIDAE

Family CERACIDAE (Meyrick)

Tortricidae, Walker, 1863, *List Lepid. Ins. Brit. Mus.* **28:** 422. Moore, 1888, *Descr. Lepid. Atkinson*: 279. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **140:** 20 (Group B, pro parte).
Lithosiidae, Butler, 1881, *Ill. Lepid. Heter. Brit. Mus.* **5:** 35. Warren, 1888, *Trans. Zool. Soc. Lond.*: 295.
Lithosiinae (subfam.), Cotes & Swinhoe, 1889, *Cat. Moths India*: 733.
Ceracinae (subfam.), Cotes & Swinhoe, 1889, *Cat. Moths India*: 699.
Tineina, Snellen, 1903, *Tijdschr. Ent.* **46:** 26.
Plutellidae, Meyrick, 1907, *J. Bombay Nat. Hist. Soc.* **17:** 748.
Ceracidae, Meyrick, 1908, *Rec. Indian Mus.* **2:** 395.
Ceracidii (subfam.), Diakonoff, 1939, *Zoöl. Meded.* **21:** 128.

Head smoothly scaled, face smooth, vertex in both sexes, especially in ♂, with a thick, smooth tuft of long hairs partially encircling the base of each antenna, flattened or separated in middle of vertex. Eyes considerably protruding. Ocelli moderate, posterior. Antenna ⅓–½, scape short and stout, with very short smooth scales, without pecten, scapes considerably approximated to each other on top of vertex in ♂, less distinctly so in ♀; flagellum slender, fasciculate-ciliate in ♂, cilia curved, minutely pubescent in ♀. Proboscis short. Maxillary palpi obsolete. Labial palpi short, mostly stout, porrect or subascending, mostly somewhat curved, median segment thickened with scales, roughly projecting along lower edge, terminal segment very short, obtuse, roughish. Thorax smoothly scaled, without crest, tegulae edged with rough, projecting scales. Abdomen rather long. Legs strong, smoothly scaled, inner posterior spurs long. Fore wing without costal fold in ♂, elongate-ovate or elongate-truncate, often with a rectangular notch at apex on vein 7. All veins separate: 1b furcate, furca mostly very long, 2 from beyond ½ to before ¾, 3 from angle, 3–5 remote, 6 more remote from 5, parallel, 6–8 more or less approximated towards base, considerably diverging posteriorly, 7 to termen or apex, 10 remote from 9, 11 from beyond ⅓ of cell; mostly two accessory cells developed: upper parting vein from half-way between 11 and 10 to between 9 and 8, to the base of 8, or to between 8 and 7; second parting vein straight from base of upper edge of cell to between 4 and 5. Hind wing ¾, without cubital pecten, broad, ovate, or subtrapezoid; 1a simple, 1b shortly furcate at base, 1c partially weak, 2 from ½ to ⅔ of lower edge of cell, seldom 3 from angle and 4 approximate at base, mostly 3 and 4 connate from angle, or shortly stalked or 4 absent; 5 approximate at base, 6 and 7 more or less closely approximate towards base or even coincident along basal ⅙, 8 separate, long, straight; discoidal vein inwardly angulate, often obliterate in middle, parting vein mostly developed, to the middle of discoidal, furcate at distal end.

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[1] Except *Crothaema* Butler (Madagascar) and *Mimeoclysia* Diakonoff (Java).

[2] Except *Sparganothis* Hübner (Palae- and Nearctic) and allied genera.

Male genitalia with tegumen moderate, uncus long, pointed and hairy beneath distally, gnathos strong, hook-shaped, socii mostly large, drooping, bristly. Valva simple, semiovate or elongate-truncate, mostly densely bristled along harpe and cucullus. Aedoeagus curved and narrow, or straight and cylindrical; cornuti sometimes present: numerous spines. The 7th abdominal segment in female is mostly strongly sclerotized and its posterior edge is often deeply emarginate on the ventral side; by this emargination the ostium becomes very wide and the ventral appendages of the anapophyses form a sclerotized transverse band *above* the ostium, and not, as usually is the case in the family Tortricidae, *below* the ostium. For this part in the latter family the author proposed the name of *limen* (= threshold), which seems to be less well chosen in the case of Ceracidae. However, this name is retained here, as this part is, without doubt, homologous with the limen in Tortricidae. The shape of this transverse band is useful for the separation of species; it acquires in the genus *Pentacitrotus* a considerable development; ostium funnel-shaped, signum mostly a moderate scobinate curved plate at the base of ductus bursae.

The family is a natural group of multicoloured big moths of typical habitus. According to the venation they are related to the Tortricidae, but in other respects they differ so considerably from them that the separation into an independent family within the superfamily Tortricoidea seems necessary. The history of the family is mentioned above.

The peculiar habitus of head—with the bases of antennae approximated and encircled by long hairs of the flattened tuft on vertex—uniform obtuse scarcely dilated palpi, the large protruding eyes, the shape of fore wing, the colouring of hind wing and characteristic genital features show clearly enough that we have to do with a homogeneous and distinct off-shoot of the Tortricoid branch. Rather primitive genital structures, coupled with the bright colouring of both fore and hind wing and the smooth head can possibly be regarded as archaic features, pointing towards some ancestors common with Glyphipterygidae, while the 'simplified' neuration shows considerable specialization parallel with the higher—but not the highest—Tortricidae. Contrary to Meyrick's opinion, the present family has no connexion whatsoever with the highly developed Tortricid genus *Zacorisca* Meyrick and allies, of which the ♂ genitalia are specialized in the extreme. Affinity with the South American Tortricid genus *Atteria* Walker and allies is probable; in that case the latter group of genera may form the connexion between Ceracidae and Tortricidae.

The life-history is known of only one species, *Bathypluta triphaenella* (Snellen), of which the larvae, injurious to the tea-plant and to the Cinchona-tree in Java, have been reared. Figures of these larvae were drawn on posters of the Institute for Plant Diseases, Buitenzorg. A description of the larval stages has never been published, however, and it is not possible for the author to obtain any material for study at present. Another species, *Pentacitrotus quercivorus* sp. nov. has been bred once from *Quercus semicarpifolia* in Himalaya.

The family Ceracidae has a limited distribution (Fig. 1): it is typical for central Asia from Kashmir to Burma and from Bengal to Ussuri, China, Japan, and Formosa, with a single straggler in North Borneo and Java. There is little doubt that the family will also be found in Sumatra.

The discrimination of the four genera mentioned below is easy and is based on constant characters, viz. shorter or longer furcation of vein 1b, position of vein 7 in fore wing, and presence or absence of vein 4 in hind wing, supported by the habitus and the genital characters of the species. *Pentacitrotus* must be regarded as a primitive form from which *Eurydoxa* and *Cerace* may have developed, the latter genus being the most specialized one. The rather numerous species of *Cerace* may be arranged in order of the development of this genus, of which the most characteristic tendency is the formation of a notch in the margin of fore wing on vein 7; furthermore in a change of the shape of wing, which becomes narrower and longer, the length of terminal veins increasing accordingly, parallel with the extremely long furcation of vein 1b. The genitalia show a development from a rather narrow, truncate little bristled valva with a thorn on the sacculus, towards a valva which is broad, densely bristled along cucullus and harpe, and has an unarmed sacculus. The arrangement here commences with *tetraonis* Butler as the primitive extreme and ends with *sardias* Meyrick, as the most specialized species, which shows a distinct relation with the fourth specialized and decadent genus *Bathypluta*, with small socii and atrophied signum.

KEY TO THE GENERA OF CERACIDAE

1. Hind wing with vein 4 absent (seldom present, then distinctly stalked with 3). Socii small. Signum absent . . . . *Bathypluta*
   Hind wing with vein 4 present, separate, or connate with 3. Socii moderate. Signum present 2
2. Fore wing with apex rounded, indefinite, vein 7 to apex or costa, veins 9 and 10 distinctly converging posteriorly . . . . *Pentacitrotus*
   Fore wing with apex rectangular or notched, vein 7 to termen, veins 9 and 10 parallel or slightly diverging posteriorly 3
3. Fore wing with vein 1b furcate over not more than ¼ of its length *Eurydoxa*
   Fore wing with vein 1b furcate over more than ¼ of its length . . *Cerace*

Genus PENTACITROTUS Butler

Pentacitrotus Butler, 1881, *Ill. Lepid. Heter. Brit. Mus.* **5:** 35, pl. 86, fig. 5 (descr.). Warren, 1888: *Proc. Zool. Soc. Lond.* 295. Diakonoff, 1939, *Zoöl. Meded.* **29:** 132, figs. 1D–G, 2D (descr. generic charact. and genitalia ♂, ♀).

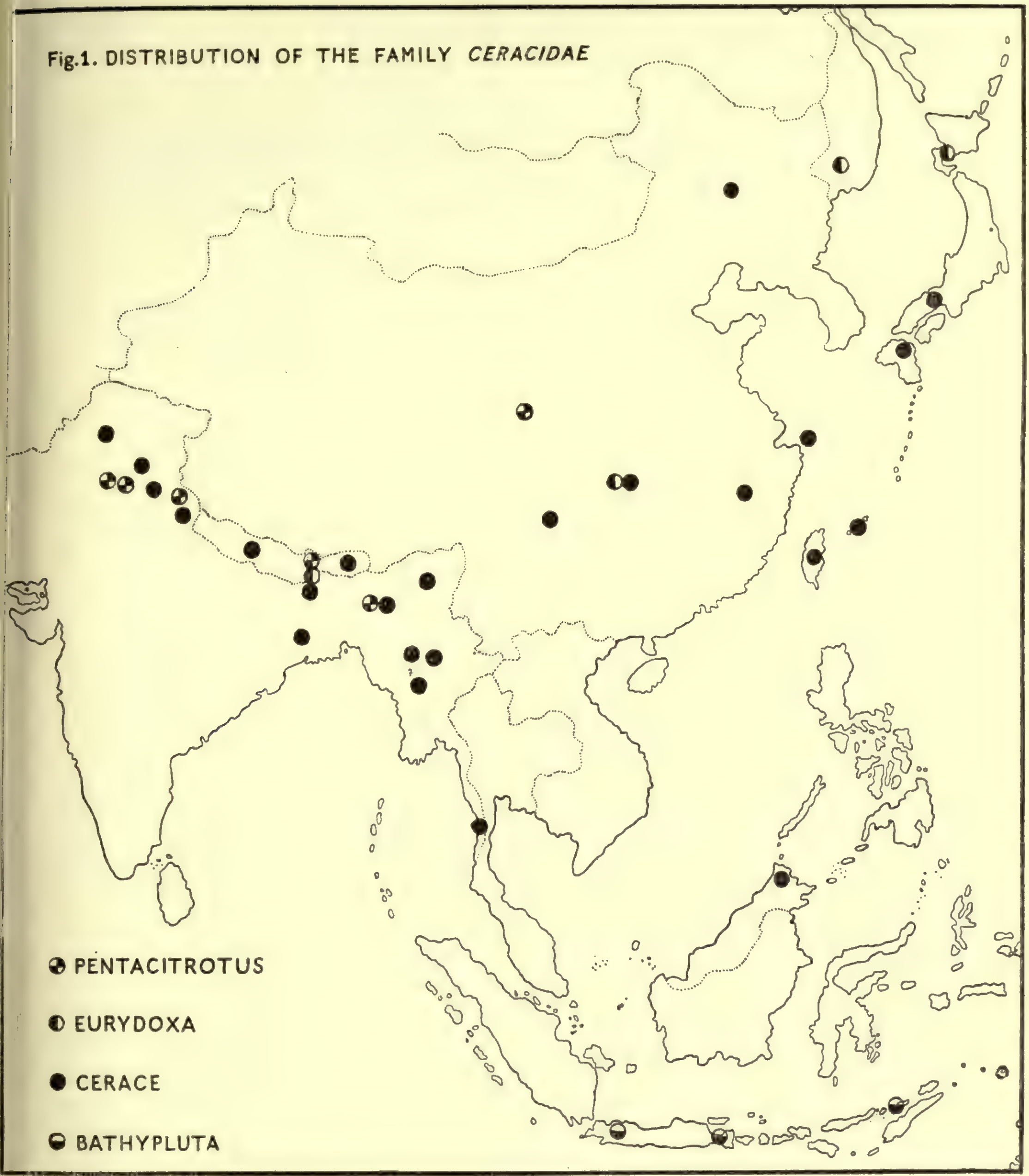


Fig.1. DISTRIBUTION OF THE FAMILY *CERACIDAE*
◕ PENTACITROTUS
◐ EURYDOXA
● CERACE
◒ BATHYPLUTA

FIG. 1. Distribution of the family *Ceracidae*.

Cerace, Meyrick, 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.*, **149:** 20. Fletcher, 1929, *Mem. Dep. Agric. India Ent.* **11:** 43.
Type species: *Pentacitrotus vulneratus* Butler.

Head (Fig. 2) smooth, a small, smooth tuft of scales on vertex, divided in middle, enveloping scape of each antenna; scales of collar narrow, hair-like. Ocelli posterior. Proboscis short. Antenna ½, slender, scape short and stout, smoothly scaled, flagellum fasciculate—ciliated in ♂ (ciliations 3), shortly pubescent in ♀. Palpus in ♂ very short, porrect, slightly curved, median segment rather slender, little thickened in middle, curved, with roughly appressed scales somewhat projecting along lower edge; terminal segment very short, obtuse, with appressed scales; in ♀ a little longer, lower edge of median segment longer, bluntly pointed. Thorax and legs smoothly scaled. Fore wing (Fig. 2) elongate-ovate, dilated posteriorly, with costa curved throughout, apex broadly rounded, indefinite, termen curved, oblique. 1b furcate to before ⅓, 2 from ⅔ of lower edge of cell, 3 from angle, separate and almost parallel with 4, 5–6 almost parallel, 6 nearer to 7 than to 5, 7 to apex or costa (?), 7–9 equidistant, strongly diverging posteriorly, 10 remote, from ⅔ between 9 and 11, 11 from a little before middle of cell. Upper parting vein in ♀ from beyond half-way between 11 and 10, weak posteriorly, traceable to between 7 and 8, in ♂ obliterate except at base. Lower parting vein in ♀ weak, obliterate anteriorly, appearing distinctly beyond middle of cell, running to base of vein 5, in ♂ scarcely traceable. Hind wing without cubital pecten, broadly semiovate in ♂, ovate-subtrapezoid in ♀, apex broadly rounded. 1b shortly furcate, 2 from a little beyond ⅗, 3 and 4 mostly connate from angle (in one specimen remote, in another shortly stalked in right wing, connate in left), 5 approximated at base, 6 and 7 separate, diverging in ♂, more or less approximated along basal ¼ in ♀.

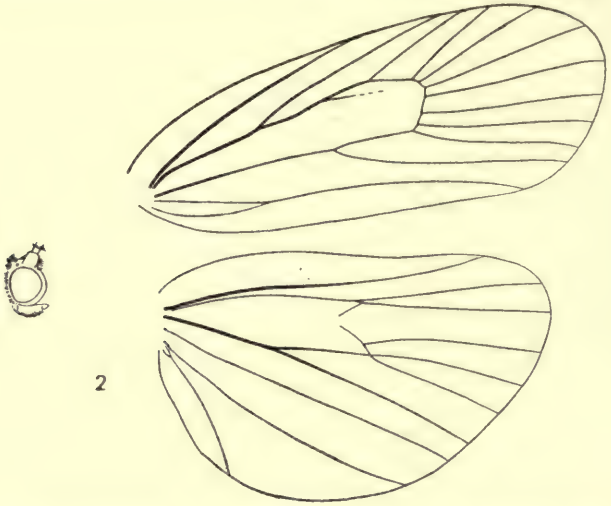


FIG. 2. *Pentacitrotus vulneratus* Butler ♂, wing neuration and head.

KEY TO THE SPECIES OF *Pentacitrotus*

Males

Hind wing crimson-orange, black marginal band continuous *vulneratus vulneratus*
Hind wing orange-yellow, black marginal edge with a yellow streak on vein 1b *vulneratus distinctus*

Females

1. Fore wing with two continuous transverse black fasciae connected in disk. 2
   Fore wing with only one transverse fascia, other interrupted or reduced to dots 3
2. Abdomen light ochreous. Anal half of wing pale ochreous . *quercivorus*
   Abdomen blackish, with orange rings, half of hind wing black *vulneratus congruens*
3. Fore wing with transverse fascia narrow, oblique, hind wing dark orange *vulneratus vulneratus*
   Fore wing with transverse fascia broad along basal ⅔, hind wing orange-yellow 4
4. Indian species. Hind wing with black markings . . *vulneratus distinctus*
   Chinese species. Hind wing without black markings . . . *aeneus*

Pentacitrotus quercivorus sp. nov.

♀ 26 mm. Head, antenna, palpus, and thorax greyish-black with leaden-metallic sheen, except palpus and antenna, the latter faintly suffused with light grey above, patagium whitish anteriorly, thorax dark grey with long, white hairs below. Abdomen evenly ochreous above, dark brown with posterior edge of segments narrowly pale ochreous below. Legs dark grey, whitish below and around articulations. Fore wing elongate-ovate, rather broad, dilated posteriorly, broadest at ¾, costa gradually arched throughout, apex and termen broadly rounded, the latter little oblique. Black, markings light orange-pinkish, extended, edged at a short distance with shining violet-metallic lines. Basal patch from base of costa very oblique, almost reaching dorsum, its top rounded; costal patch broader, erect-semicircular, on second fifth of costa, reaching half-way across cell; dorsal patch as broad as basal, before middle of wing slightly inwardly oblique, its edges parallel, its top rounded to above middle of cell; apical area with anterior edge from costa beyond middle of wing to dorsum before tornus, vertical above, oblique and concave beneath; a rather narrow marginal streak of ground colour from end of vein 10 to end of vein 5; a round black dot on middle of veins 5–6. Cilia dark grey, apex suffused with white, base black. Hind wing yellowish-orange, anal half pale ochreous; an irregular blackish apical patch, somewhat suffused posteriorly and connected with wing edge; a large ovate pale grey preterminal patch between vein 3 and fold; base of fold and vein 1b to before wing edge each with a diffuse streak of pale grey. Cilia pale yellow.

7th and 8th abdominal segments (Fig. 3) little sclerotized. Ostium: an oblique funnel, above this two lateral lobes; limen: a plate with a blunt median lobe and large lateral concave lobes. Ductus bursae moderate, narrow, weak. Bursa copulatrix moderate elongate-pear-shaped, curved, weak; signum an ovate plate with curved, slightly scobinate edges, at upper ¼ of bursa (slide No. 599 D., type).

NE. HIMALAYA, Deobar, larva on *Quercus semicarpifolia*, 10.vii.1902. Moth emerged in the beginning of viii.1902. (*E. P. Enkling*, Wals. Coll.). 1 specimen, closely allied to the following, but quite distinct in the colouring of abdomen and hind wing and in genitalia. Type in the British Museum (Nat. Hist.).

Pentacitrotus vulneratus Butler

Pentacitrotus vulneratus Butler, 1881, *Ill. Lepid. Heter. Brit. Mus.* **5:** 35, pl. 86, fig. 5 (♂). Warren, 1888, *Proc. Zool. Soc. Lond.*: 295 (♂ redescr., ♀ descr.). Cotes & Swinhoe, 1889, *Cat. Moths, India*: 733. Diakonoff, 1939, *Zoöl. Meded.* **29:** 132, figs. 1D–G, 2D (general charact. descr. genit. ♂, ♀).

Cerace vulnerata Butler, Meyrick, 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20.

♂ 23–25 mm. Head and thorax dark grey with leaden-greenish metallic sheen; collar of narrow blackish hair-scales, patagium white anteriorly; tip of metathorax dark orange. Antenna dark grey, above whitish, black-ringed. Palpus dull dark grey. Abdomen greyish-brown, posterior edge of segments with a narrow yellowish-ochreous band, ventral surface light grey, bands white, anal tuft and valva light grey. Legs dark grey, all segments with white apical rings. Fore wing elongate-ovate, dilated posteriorly, broadest at ¾, costa gradually curved from base to apex, apex broadly rounded, indefinite, termen broadly rounded, little oblique. Purple-black with greenish sheen, markings bright orange, crimson-orange or crimson, edged at a short distance with shining leaden-greenish and violet lines except in centre of disk: an oblique blotch on basal ⅙ of costa, its top rounded, not reaching base; a semicircular patch on ⅓ of costa, as broad or a little broader than preceding; a somewhat narrower slightly inwardly oblique patch on dorsum before middle, its base slightly narrowed, its top rounded reaching above middle of disk; an oblique broad band from ⅔ of costa to lower half of termen, narrowed on costa, its anterior edge convex above and beneath, with a deep knob-shaped emargination in middle, which almost interrupts the band, or forms an ovate black dot, connected with the ground colour by a narrow stalk; its posterior edge convex, leaving a narrow streak of ground colour along posterior part of costa, apex, and upper part of termen; a faint suffusion of metallic-lilac scales on dorsal and upper pre-apical orange marks. Cilia dark grey with two blackish lines, white at apex. Hind wing yellowish-orange or reddish-orange, a brownish-black band along apical and terminal ⅕–¼ and along anal ½ of wing, not reaching lower edge of cell, its anterior edge sometimes faintly projecting on veins, convex between these; sometimes a clavate streak of ground colour along basal ¾ of vein 1b, narrow, suffused patches of ground colour on end of veins along apex and termen. Cilia orange or crimson-orange, pale yellow towards base.

Tegumen (Fig. 5) erect, uncus moderate, strong, acutely pointed with a few short, fine bristles on outer side. Gnathos rather short, angularly bent in middle, with long, strong point. Socii broad, as long as gnathos. Valva short, truncate, considerably narrowed posteriorly, a patch of long, thick bristles on harpe and along cucullus.

Sacculus narrow, bristled. Transtilla absent. Aedoeagus rather small, tubular, apex thick, chitinized. (Slide No. 123 A.D. = No. 1186 B.M.; No. 597 D.)

♀ 27–35 mm. Head (Fig. 2), and thorax without greenish-metallic sheen, blackish-purple or greyish-black. Abdomen as in ♂. Fore wing (Fig. 2) pale ochreous-lilac or orange-lilac, sometimes somewhat suffused with greyish-lilac posteriorly, markings (being reduced ground colour of ♂) black, with narrow metallic-greenish lines along edges, considerably varying, mostly as follows: a somewhat curved transverse band from $\frac{1}{5}$ of costa to $\frac{2}{5}$ of dorsum, connected by a narrow line along dorsum with base of wing, sometimes broad and vertical along lower $\frac{2}{3}$, oblique and narrow above, sometimes connected with an erect transverse small patch just before middle of costa reaching to upper edge of cell, sometimes this patch reduced to a subtriangular dot not reaching costa; a subquadrate or triangular erect patch at $\frac{3}{4}$ of dorsum; sometimes a small dot in disk between this and costal patch; a round pre-apical dot on middle of vein 4; a narrow marginal line from end of vein 11 to end of vein 4, sometimes almost obliterate. Sometimes markings as in ♂, but orange markings extended. A small suffusion of shining opalescent scales on middle of fold and on upper angle of cell. Cilia glossy greyish-orange, white around apex. Hind wing crimson-orange, bright yellow-orange, or dark orange. Markings brownish-black, varying: a clavate suffusion along vein 1b, often connected with a larger ovate premarginal patch on vein 2; a more or less suffused erect pre-apical patch connected in middle with apical edge, sometimes reduced to a small dot.

7th ventrite (Fig. 4) entirely strongly sclerotized. Ostium: an obliquely compressed funnel, limen with a pointed median projection and an ovate lateral plate at each side, each crowned with a strong, concave pointed body. 8th segment sclerotized, cylindrical. Ductus bursae long, weak, its wall finely scobinated towards end, bursa copulatrix ovoid, signum a moderate elongate plate with edges curved downward. (Slide No. 1218 B.M., No. 598 D.)

Holotype ♂ (Butler) and allotype ♀ (Warren) in the British Museum (Nat. Hist.).

The following distinct forms possess identical genitalia and are described as varieties:—

Pentacitrotus vulneratus distinctus var. nov.

♂ 25 mm. Tegula black, fore wing rather broad, markings orange, tinged crimson. Hind wing yellow-orange, a yellow clavate streak on vein 1b.

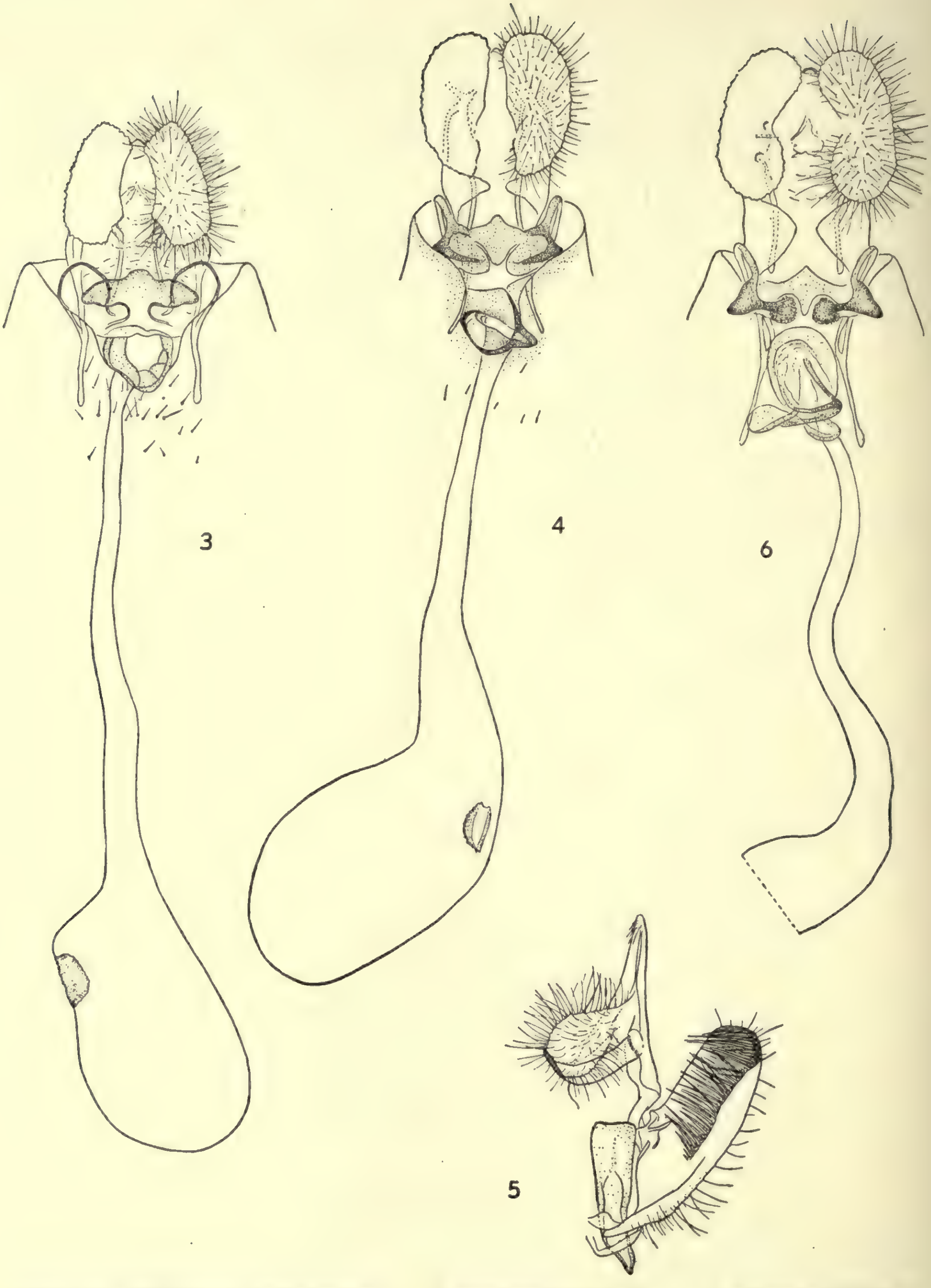
♀ 29–35 mm. Tegula black, fore wing broad, pale ochreous-lilac, dark markings broad, coarse: costal patch before middle of costa, erect, sometimes connected with transverse fascia. Hind wing orange-yellow, pre-apical patch large, erect.

INDIA, Punjab: Thundiani, 86, 128, 10.x.83 (206): 1 ♀ (Warren's allotype). Kulu District (Crowley Coll.): 1 ♂, 1 ♀. (In the British Museum (Nat. Hist.).)

Pentacitrotus vulneratus congruens var. nov.

♀ 31 mm. Tegula black, fore wing with markings as in ♂ of the type, but somewhat more extended, orange-crimson. Hind wing dark orange, anal half from base to costa beyond apex black, a dark orange triangular marginal patch above middle of termen.

INDIA. 1901 (*H. J. Elwes*). 1 specimen in the British Museum (Nat. Hist.).



FIGS. 3–6. Genitalia of *Pentacitrotus*: 3. *P. quercivorus* n. sp., ♀. 4. *P. vulneratus* Butler, ♀. 5. *P. vulneratus* Butler, ♂. 6. *P. aeneus* Leech, ♀.

Pentacitrotus vulneratus vulneratus Butler

♂ 23 mm. Tegula black, fore wing and hind wing with ground colour dark orange-crimson, dark band in hind wing not interrupted on vein 1b.

♀ 28–30 mm. Tegula pinkish-lilac. Fore wing pinkish-lilac, darker than in preceding and narrower, with transverse fascia narrow. Costal patch reduced to a subtriangular subcostal dot before ½, pre-apical dot small, apical line almost obliterate. Hind wing dark orange, markings narrow, blackish-grey: a narrow streak along vein 1b, sometimes absent, sometimes connected with elongate preterminal dot, pre-apical dot very small.

INDIA, Assam, Khasia Hills, vi.1895; Sikkim, v.1889 (*Dudgeon*): 2 ♂, 4 ♀. (Holotype from Darjeeling and allotype in the British Museum (Nat. Hist.).)

Pentacitrotus aeneus Leech

Pentacitrotus aeneus Leech, 1890, *Entomologist*, **23**: 83.

♀ 32 mm. Head, palpus, and thorax blackish-purple, shining (antennae missing). Abdomen blackish, a narrow posterior band along every segment orange. Legs black, faintly ringed white (damaged). Fore wing rather broad, dilated posteriorly, costa considerably curved at base, less curved posteriorly, apex broadly rounded, indefinite, termen strongly curved, oblique beneath. Light pinkish-orange, opalescent with lilac. Markings black, edged with greenish shining scales. Transverse band from ⅓ of costa to about ⅓ of dorsum, oblique, narrow along upper half, broader, vertical along lower half, an angulate projection on posterior edge below middle; base of transverse band connected by a narrow black line along dorsal edge with base of wing; costal patch at ½, erect, somewhat inwardly oblique; dorsal patch below end of cell, subquadrate; pre-apical dot moderate, round, between veins 4–6; a narrow marginal line from base of vein 10 to beyond base of vein 5. Cilia dark grey, whitish around apex. Hind wing bright yellow, basal half of vein 1b narrowly suffused with black. Cilia yellow (damaged).

7th and 8th abdominal segments (Fig. 6) considerably sclerotized. Ostium a wide, oblique funnel. Median plate above this little sclerotized with long, bluntly pointed lateral projection, followed by a rather narrow pointed lobe. Ductus bursae weak. Bursa copulatrix damaged (signum missing). (Slide No. 600 D., type.)

CENTRAL CHINA, Chang Yang, Hoope. vi.1888 (*A. E. Pratt*). Leech 62352. 1 specimen. According to the label this must be the type specimen, on which Leech's description of *Pentacitrotus aeneus* was based. This description is followed by the remark: 'One male example taken in June at Chang Yang. A female specimen of this species from Darjeeling in the British Museum (Nat. Hist.) has the band on the primaries interrupted.'

As to this the following remarks can be made. The *Pentacitrotus* species from China was represented by a unique specimen, Leech's holotype of his *aeneus*. According to the label we have this type specimen before us. However, this is not a ♂, but a ♀, and furthermore, it does not agree with Leech's description! Leech described obviously a ♀ of *Pentacitrotus vulneratus* from India. As no more material from China except this unique specimen is known, and Leech cites the locality elaborately in his description, we decided to describe this specimen but not to reject Leech's name, as a *nomen conservandum.*

As to the 'female specimen of this species from Darjeeling'—only one specimen of *Pentacitrotus* at the British Museum (Nat. Hist.) is known to the author from that locality, and that is Butler's type of *Pentacitrotus vulneratus*, a ♂.

Genus EURYDOXA Filipjev

Eurydoxa Filipjev, 1930, *C.R. Acad. Sci. U.R.S.S.* (A): 373–374, figs. 2, 3 (descr., ♀ neur.).
Ceraceopsis Matsumura, 1931, *6000 Illustr. Ins. Japan*: 1068. (Non descr. Type species: *sapporensis* Matsumura) *Syn. nov.*
Type species: *Eurydoxa advena* Filipjev, 1930.

Head (Figs. 7, 8) smooth, a smooth flattened tuft on vertex, encircling the base of antennae, divided in middle. Ocelli posterior. Tongue developed or rather short. Antenna $\frac{1}{2}$, in ♂?, in ♀ finely ciliate, sometimes thickened. Scape stout, short. Palpus short, porrect, median segment smooth above, with a rough fringe of scales below, longer in ♀, not thickened, terminal joint very short, obtuse. Thorax and legs smoothly scaled. Fore wing (Figs. 7, 8) without costal fold in male, broad, elongate-truncate, costa moderately or rather strongly curved at base, little curved posteriorly, apex shortly rounded, termen vertical, straight or little convex (in one species slightly concave above), little oblique beneath. All veins separate, 1b furcate along basal $\frac{1}{6}$ or to before $\frac{1}{4}$, 2 from $\frac{2}{3}$–$\frac{3}{5}$, 3 from angle, 4 more or less approximated, 5 parallel, remote from 4, widely remote from 6 at base, mostly distinctly converging posteriorly, 7 to termen, 9–11 parallel, 11 from distinctly before middle of cell in ♂, from a little before middle in ♀, upper parting vein from between 10 and 9 to between 7 and 8, lower parting vein from base to between 4 and 5, sometimes weak, in ♂ indefinite. Hind wing broadly semiovate or subovate, without cubital pecten. 1b shortly furcate at base, 2 from beyond $\frac{1}{2}$ to $\frac{2}{3}$, 3 from angle, separate or connate with 4, 5 approximated at base, 6 and 7 more or less approximated towards base, 7 to apex, 8 long, free; parting vein weak, from base to angularly bent middle of discoidal vein, sometimes shortly furcate at apex.

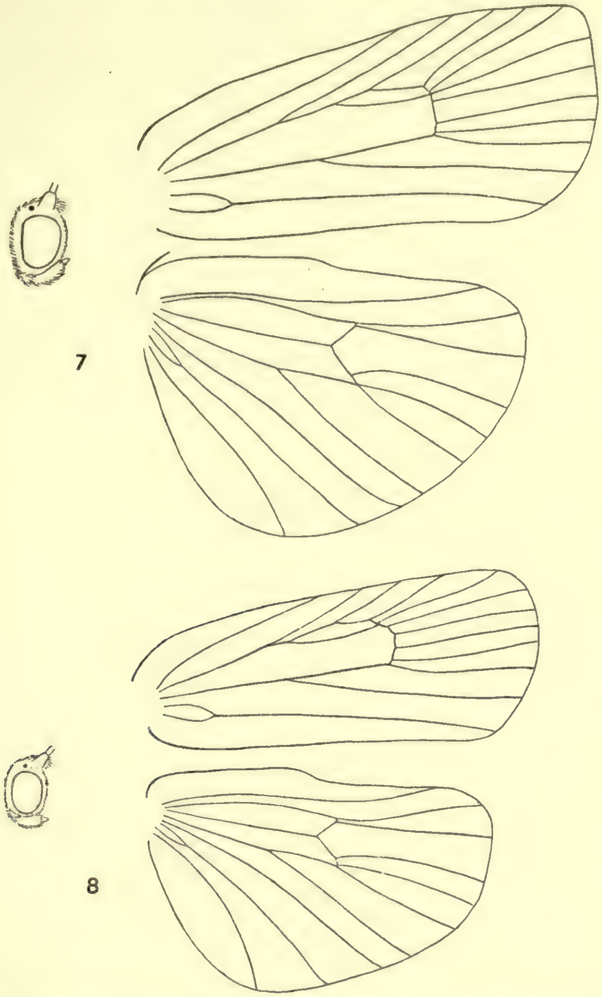
KEY TO THE SPECIES OF *Eurydoxa*

1. Hind wing white with black markings . . . . *tamsi*
Hind wing not thus 2
2. Hind wing suffusedly black, a streak in disk, and markings between anal veins yellow . . . . *sapporensis*
Hind wing brownish-grey with a suffused orange-pink subcostal spot at $\frac{2}{3}$ *rhodopa*
Hind wing orange with numerous black dots . . . . . . *advena*

Eurydoxa rhodopa sp. nov.

ῥόδεος = pink, ὄψις = eye.

♀ 29 mm. Head (Fig. 8) blackish-brown, vertex orange posteriorly. Antenna dark brown, black-ringed (damaged). Palpus straight, short, rather roughly scaled throughout, with a fringe of projecting scales along lower and apical edge but not dilated, fuscous, terminal segment dark grey. Thorax blackish, patagium and tegula (damaged) orange. Abdomen dark brown, a long loose fringe of ochreous scales along posterior edge of segments. Legs dark brown, anterior suffused with ochreous; tarsi ringed with ochreous. Fore wing (Fig. 8) moderately broad, with upper parting vein to between veins 7 and 8, vein 1b furcate along $\frac{1}{4}$ of its length; costa strongly arched at base, gradually curved in middle, straight before apex, apex shortly rounded, termen straight above, convex beneath, vertical. Blackish-brown, very densely and regularly covered with numerous small round dots and along costa oblique transverse streaks ochreous-whitish, irregularly suffused with yellowish, with orange-pink and here and there with dark crimson; more distinct are a suffused streak below costa and a



FIGS. 7–8. Wing neuration and head: 7. *Eurydoxa sapporensis* (Matsumura), ♂. 8. *E. rhodopa* sp. n., ♀.

rounded suffusion above middle of disk at $\frac{2}{3}$; a well-defined, orange-reddish, rather narrow terminal fascia from apex to above tornus. Cilia (damaged) black, with a white patch at apex. Hind wing dark bronze-brown, a somewhat suffused irregular patch below costa at $\frac{2}{3}$ of wing, and a narrow, irregular line before upper half of termen ending in a small apical patch orange-reddish. Cilia orange-reddish with dark brown basal half along apex and upper half of termen, dark brown elsewhere.

7th ventrite (Fig. 9) little sclerotized, its posterior edge straight. Anapophyses short. Limen considerably dilated towards middle, its anterior edge excavate, this excavation continued into thickened short curved rims, which form the lateral rim of the ostium. Postapophyses short, ovipositor lobes ovate, little dilated posteriorly. Ostium rather small, ductus bursae immediately beginning with a cylindrical colliculum, which is sclerotized and possesses a very strong refracting wall. Ductus bursae moderately broad elsewhere, simple, signum small, a rounded, convex plate with regular, small dentations. (Slide No. 582 D., type.)

China, Tse-Kou, 1898 (*P. Dubernard*, Paravicini Coll.). 1 specimen. An early form according to the markings and the genitalia, with little affinity to the other species; structurally little diverging from the following. Type in the British Museum (Nat. Hist.).

Eurydoxa sapporensis (Matsumura)

Ceraceopsis sapporensis Matsumura, 1931, *6000 Illustr. Ins. Japan*: 1068, fig. 2129 (♂); 1932, *Insecta Matsumurana*, **6**: 199.

♂ 35 mm. Head (Fig. 7) pale yellow, face and base of antennae edged with dark brown, collar laterally whitish, dorsally dark brown, mixed with yellow scales posteriorly. (Antennae missing.) Palpus blackish-grey, basal segment and fringe along lower edge of median white. Thorax blackish-brown, white from beneath, patagium mixed with pale yellow laterally, tegula edged with pale yellow, metathorax mixed with sparse, pale yellow scales. Abdomen blackish-brown, ventrally white, segments edged with yellow posteriorly, anal segment blackish. Legs with femora white, bases blackish, tibiae yellowish-ochreous, blackish from above except on apex, median tarsus blackish white-ringed, apical half of basal segment yellow, posterior tarsus dark grey, segments diffusely edged with ochreous, basal segment long. Fore wing (Fig. 7) with vein 1b furcate along basal $\frac{1}{5}$, upper parting vein ending almost at base of vein 7, lower parting vein indistinct; elongate-truncate, rather broad, gradually dilated posteriorly (broadest at $\frac{5}{6}$), costa abruptly considerably arched at base, straight to $\frac{3}{4}$, convex there, straight before apex, apex shortly rounded, termen straight and vertical in front, gradually rounded and little oblique behind. Brownish-black with a faint coppery gloss, markings pale yellow: a series of oblique irregular transverse streaks on costa, some of them furcate (asymmetrical in right and left wing), others interrupted or dissolved into 2–3 small rounded dots; about 4 horizontal longitudinal rows of rounded dots, which decrease in size posteriorly; a somewhat curved elongate-ovate spot between veins 2–5 beyond $\frac{4}{5}$ of wing, followed by an ovate bright orange spot before $\frac{3}{4}$ of termen, connected by a short yellowish projection at base with terminal edge; a small round orange dot before termen above tornus. Cilia greyish-black with coppery gloss, a pale yellow dot on apex. Hind wing with veins 3 and 4 connate; broadly semiovate, dark blackish-brown, appearing darker where the spotted black markings of under side show through; markings orange-ochreous; a narrow streak with somewhat diffuse edges along lower edge of discal cell from base to ⅔ of wing, dilated along apical ⅓ with two dentations above and a few diffuse dots above these; a more or less interrupted narrow zigzag streak between veins 1b and 1c; a suffused and interrupted narrow preterminal streak; costa whitish. Cilia white, basal ⅓ blackish, suffused with blackish-brown along dorsal ⅓ of wing.

Tegumen (Fig. 12) short, broad. Uncus short, top rounded with a short patch of bristles on under side. Gnathos arms dilated at base, point curved, slender, long. Socii dilated, almost reaching the hook of the gnathos. Valva elongate-truncate, costa indefinite, cucullus slightly rounded, with dense long bristles which are continued in an oblique patch on harpe over ¾ of disk of the valva. Saccus rather narrow gradually dilated towards base, sclerotized, short-bristled, ill-defined posteriorly, ending in a short tooth. Juxta sclerotized. Anellus strong. Transtilla not perceptible. Aedoeagus hinge long. Aedoeagus very long, curved, strongly sclerotized, slender, with a lateral subapical tooth. (Slide No. 581 D.)

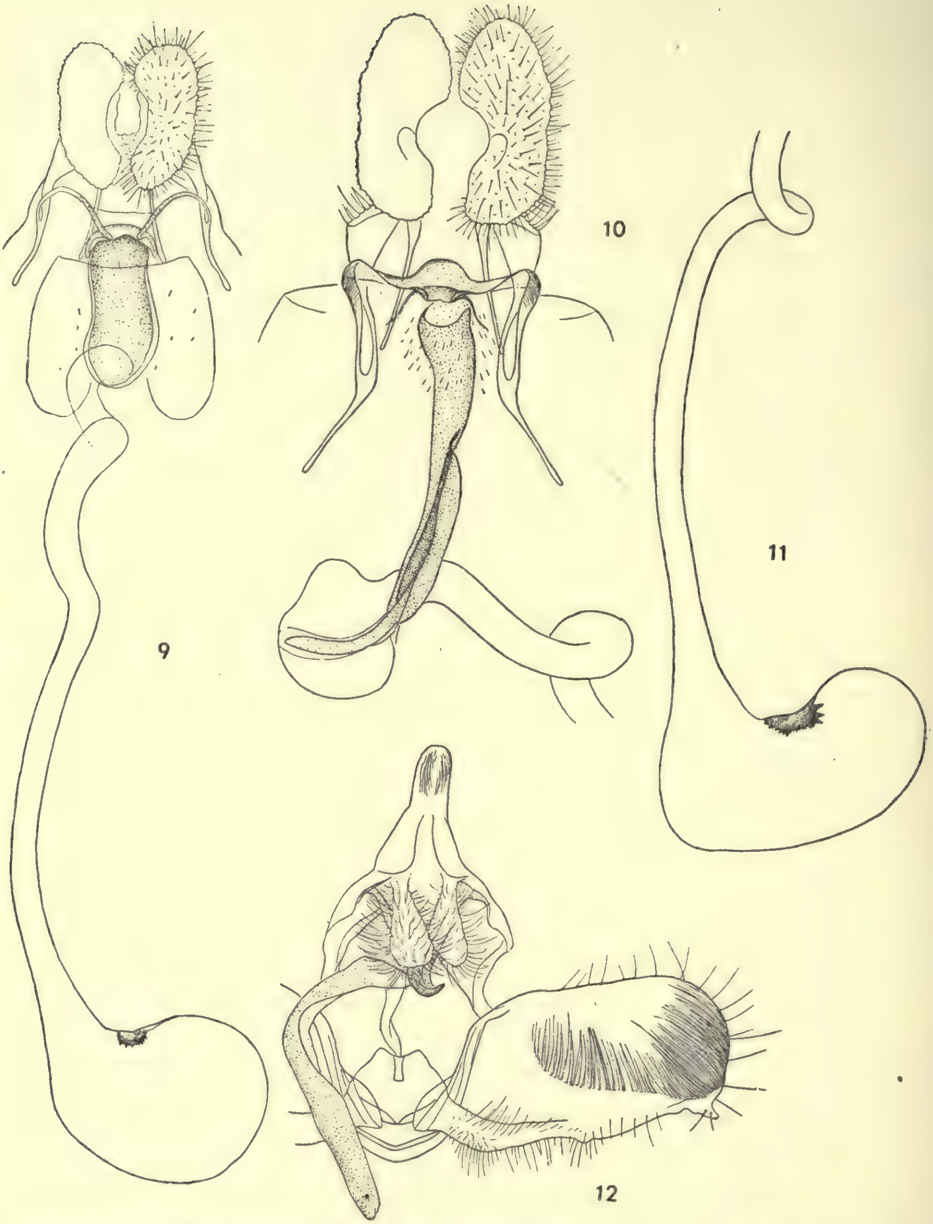
JAPAN, Jesso, Sapporo, 6.viii.1916 (*T. Issiki*), 1 ♂. Type location unknown.

Eurydoxa advena Filipjev

Eurydoxa advena Filipjev, 1930, *C.R. Acad. Sci. U.R.S.S.* (A): 374, figs. 1–3 (descr. fig. ♀, neur.).

The author has not seen this species. The description (in German) may be translated as follows:

40 mm. Head black, vertex between antennae and face sulphur-yellow, except a narrow black edge along eyes. Antenna thick, short (about ½), scape very stout, black, very narrowly white-ringed. Tongue developed. Labial palpus small, black above, orange beneath. Thorax black, markings sulphur-yellow: distal parts of patagium, anterior edge of tegula, two minute dots on mesothorax, two somewhat larger dots on metathorax anteriorly and a few scales at its apex. Abdomen black, posterior part of segments orange, from ventral side orange colouring more extended, black colour almost entirely disappearing. Coxae and femora almost entirely orange, tibiae orange with black longitudinal markings, tarsi with basal segment black above, laterally and below orange, other segments black, orange-ringed. Fore wing black with sulphur-yellow dotting, which recalls that in *Cerace stipatana* Walker; costa with irregular transverse bands and dots; at base four longitudinal series of round dots, towards termen seven such series; the largest ones, in third row (from below), are larger than the dots in *stipatana*. Termen considerably less oblique than in *stipatana*. Erect preterminal orange patch from the end of vein 7 almost to tornus. Cilia short, black. Hind wing orange, dotted with black: a double row of dots along costa, less numerous anteriorly; two rows from edge to base between lower edge of cell and vein 1c and between 1c and 1b; towards base the dots melt into each other to form a continuous line, narrowed anteriorly between 1b and 1c. In cell 2 dots reach halfway across wing, in cells 3–6 halfway between edge and closing vein. Cilia orange, here and there suffused with black, towards base a weak antemedian line.



FIGS. 9–12. Genitalia of *Eurydoxa*: 9. *E. rhodopa* sp. n., ♀. 10. *E. tamsi* sp. n., ♀. 11. *E. tamsi* sp. n., bursa copulatrix, less magnified. 12. *E. sapporensis* (Matsumura), ♂.

SIBERIA, Ussuri Mountains, Sutchan Region, 1,400 m., 11.vii.1928, in daytime in a forest of *Picea ajanensis* Fisch. and *Betula ermanni* Cham. (*A. Kuznezov*). The type specimen (unique) is probably in the Museum of the Academy of Sciences of U.S.S.R. in Leningrad. Obviously related to preceding.

Eurydoxa tamsi sp. nov.

♀ 47 mm. Head white, face (damaged) with a large, round purple-black spot in middle; collar black edged with white. Antenna with basal segment purple-black, shaft dark grey, faintly ringed white. Palpus with median segment long-fringed with rather rough hairs beneath, white, median segment above except at apex and terminal segment, which is very short, black. Thorax purple-black (rubbed off, probably with two pairs of lateral and one apical white spot); patagium purple-black, broadly edged with white. Abdomen whitish-yellow, tergites 1–4 purple-black with yellow posterior edge, tergites 5–7 with a pair of purple-black spots; each segment with a large ventrolateral spot; anal tuft brighter yellow. Legs pale yellow, tibiae with a black basal band, tarsi black with whitish rings on apex of segments. Fore wing with vein 1b with furca not reaching ¼ of its length, both parting veins present, upper ending between veins 7 and 8; costa moderately curved along ¼, straight in middle, faintly prominent at ⅗, almost straight posteriorly, apex bluntly rounded, termen considerably convex, slightly emarginate on vein 6, rounded and rather oblique beneath. White, irregularly densely reticulate and striped with black, except in middle of disk, oblique transverse fasciae on costa, increasing in width posteriorly; terminal veins 4–6 black except at base; especially distinct: lower edge of cell with vein 3 and discal vein which is interrupted above middle; black colour more or less confluent and covered with horizontal rows of round white dots along dorsum, and terminal and apical ⅕ of wing; a moderate, elongate irregularly ovate orange patch on termen between veins 2–5. Cilia black, glossy (damaged). Hind wing subovate, with veins 3 and 4 separate, veins 6 and 7 approximated towards base, but distinctly separate; white, apical and terminal ¼ as far as vein 1c dark grey, covered with diffuse, irregular black dots more or less indicating transverse bands; irregular black dots in cells as far as vein 1b, faint blackish suffusion on vein 1a. Cilia glossy, white, around dark area mixed with grey and dotted with black (damaged).

7th ventrite (Fig. 10) little sclerotized. Anapophyses short. Limen with a rounded dilation in middle. Colliculum a strong tube, slightly narrowed below, then obliquely truncate. Ductus bursae long, narrow. Bursa copulatrix (Fig. 11) boot-shaped, signum beyond the ostium of bursa: a stellate plate. (Slide No. 603 D., type.)

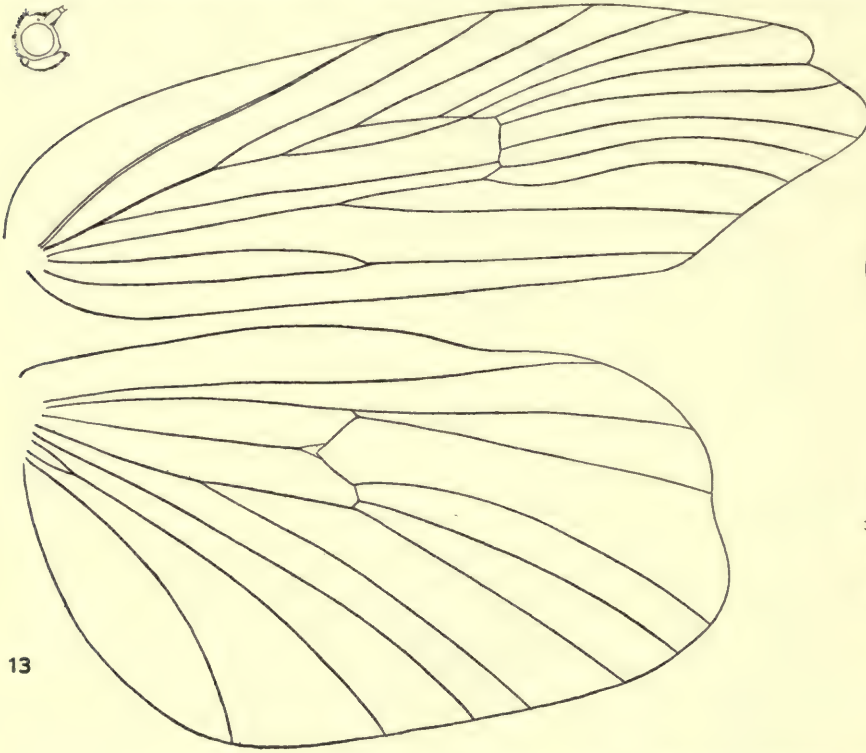
INDIA, Sikkim, Phedong (= Padong). (*R. P. Desgodins*, Paravicini Coll.). 1 specimen. Possibly this species will prove to be related to the foregoing, when the ♂ becomes known. Superficially it recalls *Cerace stipatana*. Type in the British Museum (Nat. Hist.).

Dedicated to Mr. W. H. T. Tams, British Museum (Nat. Hist.), out of gratitude for his interest in this revision.

Genus Cerace Walker

Cerace Walker, 1863, *Cat. Lepid. Heter. Brit. Mus.* **28:** 422. Moore, 1888, *Descr. Lepid. Atkinson, Heter.*: 219. Cotes & Swinhoe, 1889, *Cat. Moths India*: 699. Walsingham, 1900, *Cat. Heter. Mus. Oxon.* **2:** 565. Meyrick, 1908, *Rec. Indian Mus.* **2:** 395; 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20. Fletcher, 1929, *Mem. Dep. Agric. India, Ent.* **11:** 43. Diakonoff, 1939, *Zoöl. Meded.* **21:** 130, figs. 1A–B, 2A–C.
Atteria Meyrick (*nec* Walker), 1910, *Proc. Linn. Soc. N.S.W.* **35:** 221.
Type species: *Cerace stipatana* Walker.

Head (Figs. 13, 14) smooth; a dense, smooth tuft on vertex encircling basal segments of antennae, flattened between these. Ocelli posterior. Tongue rather short. Antennae approximated on vertex, especially in ♂, with scape short and thick, smoothly scaled; flagellum slender, fasciculate—ciliate in ♂, shortly pubescent in ♀. Palpus short, porrect, mostly slightly curved, median segment stout, broadest in middle, above with appressed scales in male, smooth in ♀, both with a short fringe of loosely projecting scales along lower edge and often on apex, terminal segment very short, obtuse, roughish (sometimes concealed). Thorax and legs smoothly scaled. Fore wing (Fig. 13) without costal fold in male, elongate-truncate, or rather narrowly elongate-ovate, apex varying from rounded-rectangular to deeply notched on vein 7,



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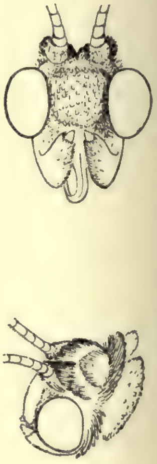

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Figs. 13–14. *Cerace stipatana* Walker, ♀. 13. Wing neuration and head. 14. Face and vertex of head.

termen from vertical to considerably oblique. All veins separate. 1b furcate, with furca from $\frac{1}{3}$ to $\frac{1}{2}$, longer in ♂, 2 from beyond middle to $\frac{3}{5}$, 3–7 slightly diverging (3–5 almost equidistant), 5 remote from 6, 6–9 slightly approximated at base, 7 to termen or to the notch, in that case termen strongly obtusely prominent between veins 6 and 5, forming a false apex, from there very oblique, 9–11 parallel, 10 about twice as far from 11 as from 9. Upper parting vein always developed in ♀, rarely partially obliterate in ♂, from half-way between 11 and 10 to between 9 and 8, or to 8, or to between 8 and 7, lower parting vein from base of radius to between veins 4 and 5, sometimes partially obsolete in ♂. Hind wing without cubital pecten, varying in shape from broadly semiovate to elongate-semiovate or rounded subtrapezoid. 1b shortly furcate, 2 from $\frac{3}{5}$ to $\frac{2}{3}$, 3 from angle, rarely connate, mostly closely approximated at base, seldom remote, 5 approximated at base, 6 and 7 closely approximated, rarely coincident towards base, parting vein from base to middle of angularly bent discoidal vein, sometimes weak.

KEY TO THE SPECIES OF *Cerace*

Males

1.	Basal $\frac{2}{3}$ of both fore and hind wing bright yellow	*sardias*
	Not so	2
2.	Termen in fore wing straight above	3
	Termen in fore wing notched on vein 7, more or less prominent below notch	4
3.	Ground colour of hind wing orange-yellow, smaller, Indian species	*tetraonis*
	Ground colour of hind wing pale yellow, larger, Chinese species	*anthera*
4.	Ground colour of hind wing white.	*stipatana*
	Ground colour of hind wing yellow or orange	5
5.	Hind wing with cilia unicolourous yellow-orange; anal $\frac{1}{3}$ of hind wing densely covered with partially confluent black dots.	*xanthocosma*
	Hind wing with cilia at least more or less marked with black; anal $\frac{1}{3}$ of hind wing mostly with only a few or without markings	6
6.	Ground colour of hind wing pale yellow.	*onustana*
	Ground colour of hind wing pale or bright orange	7
7.	Hind wing with round, black preterminal dots between apical area and anal edge	*cyanopyga*
	Hind wing with a few irregular blotches between veins 1b–2, almost connected with apical black band, not reaching anal edge	*xanthothrix*

Females

1.	Basal $\frac{2}{3}$ of fore and hind wing bright yellow	*sardias*
	Not so	2
2.	Fore wing yellow-orange, reticulate with ferruginous-violet	*ios*
	Not so	3
3.	Termen in fore wing straight above or slightly concave	4
	Termen in fore wing more or less distinctly notched on vein 7	5
4.	Head and thorax ochreous white	*loxodes*
	Head and thorax black, the latter with yellow spots	5

5. Hind wing with a premarginal more or less continuous series of black blotches or with a black band posteriorly to costa before apex *tetraonis tetraonis*
Hind wing with 2–3 more or less isolated large round premarginal spots and sometimes a few small blotches . . . . . . *tetraonis archimedis*
6. Hind wing with ground colour throughout or only on basal half white . 7
Hind wing with ground colour yellow or orange, without white . . 9
7. Hind wing with ground colour white throughout . . . *stipatana*
Hind wing with ground colour white on basal half, suffused with yellow or fuscous posteriorly 8
8. Hind wing white on basal half, suffused with yellow posteriorly. Head, at least on vertex, black . . . . *myriopa*
Hind wing whitish with a fuscous blotch spotted dark fuscous on apical ¼ of wing. Head white . . . . *mesoclasta*
9. Base of hind wing without black markings . . . . *xanthothrix*
Base of hind wing with black markings 10
10. Hind wing with cilia yellow, only marked around apex with small black dots . . . . *xanthocosma*
Hind wing with cilia around apex black 11
11. Hind wing without black suffusion between markings except sometimes a cloudy suffusion on apical ⅕ 12
Hind wing with brownish-black suffusion between markings from apex to anal angle . . . . *onustana*
12. Hind wing without any suffusion or with a small blackish suffusion in apex; anal area with small markings little connected with each other *guttana guttana*
Hind wing with distinct suffusion on apical ⅕; anal area densely covered with large blotches mostly connected with each other . . *guttana obscura*

Cerace tetraonis Butler

Cerace tetraonis Butler, 1886, *Proc. Zool. Soc. Lond.*: 394, No. 177. Cotes & Swinhoe, 1885, *Cat. Moths India*: 699, No. 4773. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20.

Cerace perdicina Moore, 1888, *Descr. Lepid. Atkinson*: 279. Cotes & Swinhoe, 1889, *Cat. Moths India*: 699, No. 4772. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20. *Syn. nov.*

♂ 25–31 mm. Head black, a large rounded yellowish-white spot on face. Antenna black, tip of scape white above, flagellum faintly spotted with whitish above along basal half. Palpus black, basal segment and lower and apical edge of median yellowish-white, sometimes entire median segment mixed with whitish. Thorax black, with three pairs of erect, pale yellow spots; collar around head yellow, black in middle; tegula orange-red, with black edge, shoulder with a pale yellow patch. Abdomen black, posterior edge of segments orange-yellow dorsally, pale yellow laterally; ventrally pale yellow, harpe black with a yellowish spot before middle of costa. Legs black, femur and ventral half of tibia and apical ring pale yellow, tarsi with pale yellow apical rings. Fore wing with upper parting vein obliterate in middle, to between 8 and 9, lower parting vein vestigial; costa abruptly strongly arched at base, little curved in middle, apical third straight, slightly oblique, apex shortly rounded, termen straight above, convex between veins 4–6, rounded beneath. Black, with a broad, dark, brick-red fascia from base to termen, parallel to costa, occupying second fourth of wing breadth, shortly continued up and down along termen, with a row of leaden-metallic round dots throughout and a few black dots before termen; markings pale yellow elsewhere: a row of transverse streaks on costa, a few dots above the red fascia and small dots arranged in more or less regular rows below it. Cilia black with violet gloss. Hind wing orange, sometimes turning yellow anteriorly, markings blackish: more or less confluent series of transverse short blotches on anal veins mostly remaining below cubital vein (only a few rounded spots sometimes above it), connected with a broad band gradually narrowed posteriorly, along termen to costa before apex, its edges somewhat serrate, leaving patches of ground colour on termen and in apex, its top abruptly narrowed on costa. Cilia anteriorly black, posteriorly orange with diffuse patches at ends of terminal veins.

Tegumen (Fig. 15) moderately broad. Uncus long, slender, bristled underneath almost half-way to base. Gnathos arms slender, hook rather broad, curved. Socii broad, little dilated, truncate, reaching to the point of gnathos. Valva elongate, slightly curved, costa evident, narrow, cucullus obliquely rounded, densely bristled, a patch of bristles on harpe slightly oblique, almost to base of valva. Saccus strong, narrow, densely bristled towards base, ending in a blunt short point. Transtilla rather broad, straight, scarcely narrowed in middle. Aedoeagus rather long, slender, sclerotized, strongly curved. Cornuti fine scobinations and short straight thorns. (Gen. No. 579 D., specimen examined labelled: India, Simla, 7,000 ft. A. E. Jones, in Brit. Mus. (Nat. Hist.).)

♀ 33–39 mm. Yellow colour of head and thorax brighter. Yellow rings on abdomen broader. Fore wing with parting veins complete; narrower than in ♂, costa slightly convex beyond middle, termen with convex projection between veins 4–6 more distinct, otherwise exactly as in ♂. Hind wing with preterminal black band less compact and less broad than in ♂, its edges less regular.

7th ventrite (Fig. 23) little sclerotized, emarginate posteriorly, limen with a dilated plate in middle which is twice excavated on lower edge. Colliculum straight above, strongly sclerotized along lower $\frac{2}{3}$ with a round widening in middle. Ductus bursae narrow, bursa copulatrix spheroid, signum rather small, folded, densely dentate on inner surface. (Gen. No. 572 D.)

INDIA, N. INDIA, Khyra Gully; Assam, Khasias, Cherra Punji; Sikkim: Simla, Darjeeling; Punjab, Dharmsala, Murree Hills, Kulu District 2,600–7,000 ft. (*Maj. H. Roberts, Doncaster, A. E. Jones, Pilcher, Char. Maries, Hocking*) 1879, v.1895. *C. perdicina* is the male of *tetraonis*. Moore's description of *perdicina* (♂) is short and superficial. His description of hind wing, palpi, abdomen, and legs does not accord with the facts (type specimen in the British Museum (Nat. Hist.)).

Cerace tetraonis archimedis subsp. nov.

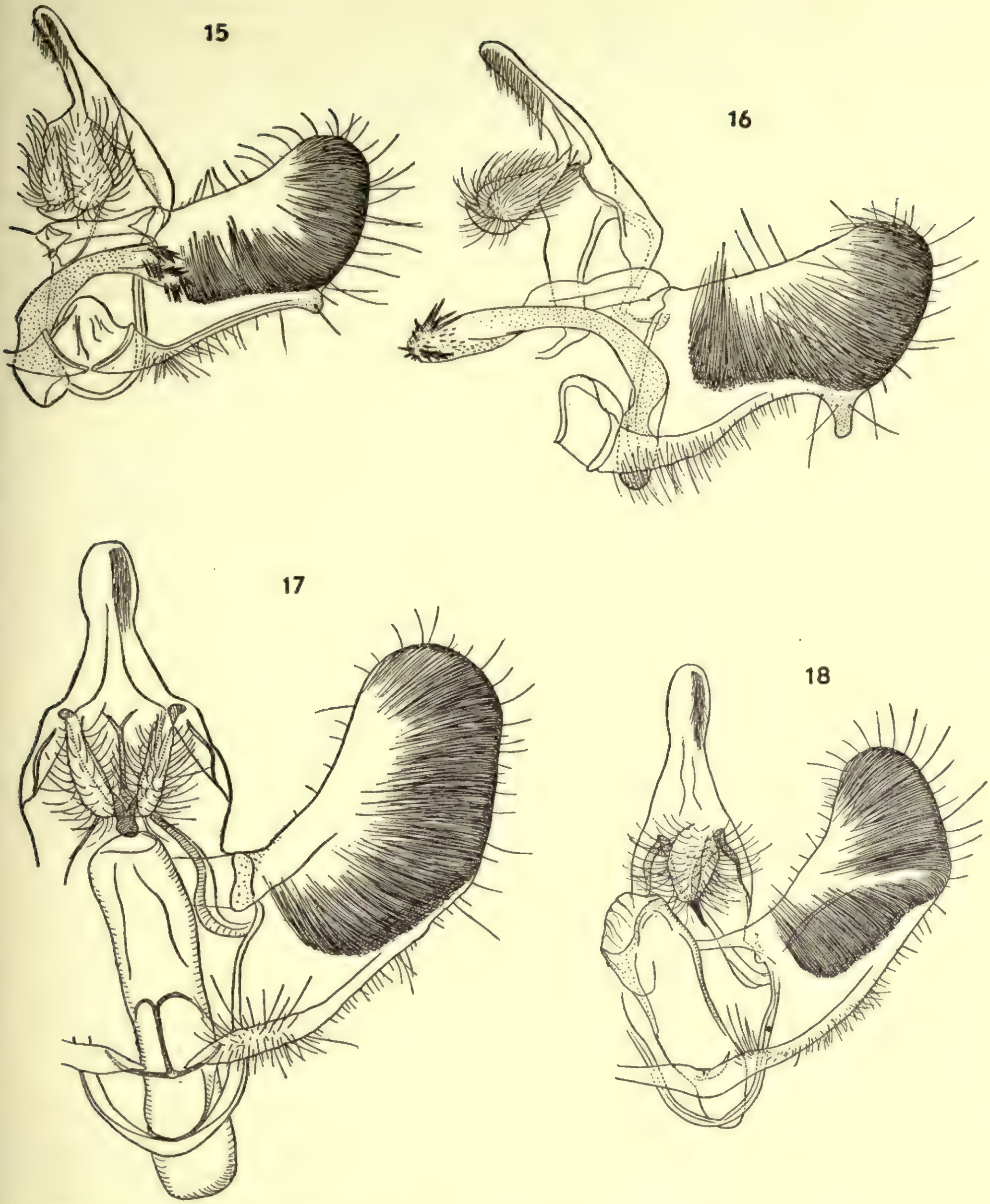
♀ 35–36 mm. Head black, face with a large rounded yellowish-white spot, collar white at sides, yellowish with a black median patch above. Antenna black, faintly ringed with whitish, basal segment edged with white along inner side. Palpus black, basal segment and ventral edge of median white. Thorax black, with yellow lateral spots, tegula with a broad longitudinal crimson band, whitish at extremities. Abdomen orange-yellow, dorsal bands along basal edges of segments, lateral row of dots and anal tuft brownish-black, or abdomen brownish-black, apical edges of segments orange-yellow; ventral side whitish. Legs black, femora white along ventral half; tibiae with white median and apical bands, tarsi white-ringed. Fore wing black, markings pale yellow; a series of oblique, irregular costal streaks, some of them furcate above or beneath or dilated in middle; dorsal area densely scattered with small dots which are more or less extended into very short streaks; a red longitudinal streak from base to termen along second fourth of wing, dilated along termen between veins 7–4, with two transverse rows of black dots and terminal edge shortly indent on veins; a series of round metallic dots rather irregularly scattered over red streak. Cilia black (damaged). Hind wing bright orange, anal $\frac{1}{3}$ with irregular small transverse black blotches between veins, sometimes more or less connected into zigzag lines; two or three large black marks before termen: first transverse irregular, sometimes connected with following, other two rounded. Cilia orange, with black dots on end of veins 2, 3, and 4 and minute black points on base of anal veins.

INDIA, Khasias, Cherra Punji, 1895 (*Doncaster*). Type in the Brit. Mus. (Nat. Hist.)). Shillong, 5,000 ft., 26.ix.1927, Fletcher Coll. Burma, Bernardmyo, Ruby Mines 5,500–6,000 ft., vi.1890, Doherty (Walsingham Coll. No. 40985). 3 ♀. The genitalia are identical with those of the typical form.

Cerace anthera sp. nov.

ἀνθηρός = multicoloured.

♂ 33 mm. Head black, face with a large rounded pale yellow spot; collar white at the sides, yellow with a median black spot above. Antenna blackish with faint white bands, basal segment with a pale yellow spot on inner side at apex. Palpus pale yellow, median and apical segments suffused with dark grey above. Thorax (damaged) with yellow spots: two lateral pairs, one spot on apex of mesothorax and a patch of long yellow hairs on each side of metathorax; tegula with an interrupted longitudinal yellow spot mixed with crimson scales. Abdomen black, ventral surface white, segments narrowly edged above with yellow posteriorly, anal segment black. Legs yellowish-white, black above, anterior tibia with median band, median tibia with median and apical bands, posterior tibia with apical band yellowish; tarsi with segments white-edged. Fore wing with upper parting vein ending between 9 and 8, lower parting vein indefinite; elongate-subovate, little dilated posteriorly (broadest at $\frac{2}{3}$); costa strongly gradually arched at base, less curved in middle, scarcely prominent at $\frac{4}{5}$, straight before apex, apex shortly rounded, termen straight above, slightly but distinctly prominent between veins 6–4, rounded, little oblique beneath; black, with purple gloss, markings pale yellow; costal area, somewhat broader than $\frac{1}{4}$ of wing, darker black, with a series of rather broad irregular transverse streaks, some of them furcate above or below, others with a few points beneath; dorsal area reaching a little over middle of wing, covered all over with numerous small dots of about the same size, arranged in irregular longitudinal rows, less numerous before termen; a



FIGS. 15–18. Male genitalia of *Cerace*: 15. *C. tetraonis* Butler. 16. *C. anthera* sp. n. 17. *C. xanthocosma* sp. n. 18. *C. xanthothrix* sp. n.

longitudinal rather narrow dark red streak from base to termen along third seventh of disk, posteriorly with three suffused elongate black spots, brighter red and dilated into short projections to veins 7 and 4 along termen, indented posteriorly on veins; this red streak bears a row of round metallic dots throughout, a pair of suffused black spots posteriorly, and a round black dot before termen. Cilia black with purple gloss, glossy metallic-blue around apex. Hind wing very broad, ovate, rather pale yellow, tinged with orange towards apex; with veins 3 and 4 separate, 6 and 7 rather remote, markings greyish-black: a broad band along dorsum and termen, gradually narrowed posteriorly, its inner edge along lower edge of cell to angle forming a rounded projection there, thence half-way between cell and wing edge, parallel to this, to costa before apex; two rounded dots in cell, irregular short transverse yellow streaks and dots on anal veins and dorsal edge; apex with an erect-ovate orange-yellow patch. Cilia bright yellow, suffused with black on dorsum and on veins 2, 3, and 4; a short black basal streak between veins 4–6.

Tegumen (Fig. 16) broad, short. Uncus long, strong, bristled over the half of its ventral surface. Gnathos rather short, with arms gradually considerably dilated towards apex, hook short. Socii elongate-truncate, dilated towards top, reaching to hook of gnathos. Valva elongate, narrowed in middle, costa evident, rather broad, cucullus obliquely rounded, densely bristled, bristles on harpe obliquely to $\frac{4}{5}$ of disk. Saccus narrow, densely bristled towards base, with a long blunt hook posteriorly. Transtilla straight, slightly indented in middle of upper edge. Aedoeagus long, slender, curved, with base slightly dilated. Cornuti straight thorns of different sizes. (Gen. No. 580 D., type.)

CHINA, Siao-Lou, 1901 (*Chasseurs indigènes du P. Dejean*). Type in the British Museum (Nat. Hist.). Unique. This species is closely allied to the preceding and can be distinguished with certainty only by the study of the genitalia. Further differences are: yellow tegulae instead of red, both fore and hind wing broader, red streak in fore wing much smaller, ground colour of hind wing and of under side rather pale yellow instead of orange.

Cerace loxodes Meyrick

Cerace loxodes Meyrick, 1912, *Exot. Microlepid.*: **1,** 19 (♀); 1912, in Wagner, *Lepid. Cat.* **10:** 15, 1913; in Wytsman, *Gen. Ins.* **149:** 20.

The author did not study this species. The original description is as follows:

'♀. 52 mm. Head and thorax ochreous-white (partly defaced). Abdomen orange. Fore wings elongate, rather narrow, costa strongly arched, apex obtuse, termen straight, rather strongly oblique; dark coppery-purple-fuscous: submedian fold from base to middle and a streak of suffusion from $\frac{1}{3}$ of disc to apical blotch orange-red; very numerous ochreous-white dots and small round spots arranged in longitudinal rows, on costa becoming transverse bars, longer towards base, on red streak posteriorly marked with silvery scales; an orange-red apical blotch, triangularly produced along upper half of termen: cilia whitish, barred with dark fuscous and at apex with reddish. Hind wings orange; a dark purple-fuscous blotch occupying apical $\frac{2}{5}$, anterior edge somewhat broken into spots, especially towards dorsum; cilia orange, on apical blotch dark fuscous, with white spots at and above apex.

'Tenasserim; one specimen.'

The type of this species is neither in the general collection of the British Museum (Nat. Hist.) nor in the Meyrick collection. Perhaps it is in the Indian Museum at Calcutta. According to the typical shape of the fore-wing this species is possibly allied to *tetraonis*.

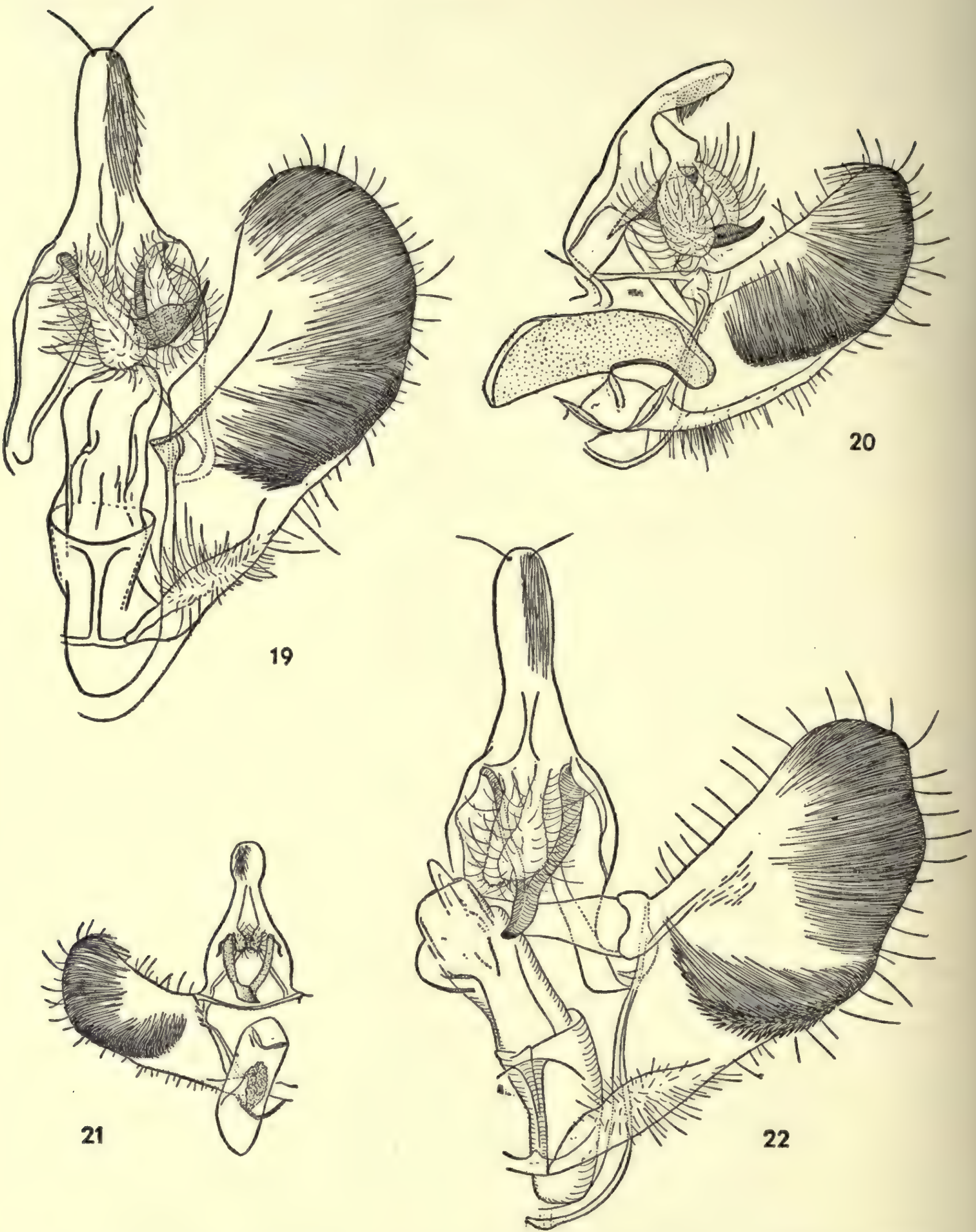
Cerace xanthocosma sp. nov.

ξανθός = yellow, κόσμος = an ornament

? *Cerace guttana* Esaki (*nec* Felder), 1932, *Nippon Konchu Zukan*: 1449, No. 2867, f. ♀, pl. 2, fig. [1].

♂ 33–40 mm. Head white, tuft around and between the base of antennae black. Antenna blackish, from above with faint light grey bands. Palpus short, rather broad, black, basal segment and lower and apical edge of median segment white. Thorax purplish-black, markings white: an anterior and an antemedian pair of narrow short lateral longitudinal streaks, a narrow streak on each tegula, apex of mesothorax white. Metathorax dark brown with a pair of yellowish-grey tufts of long hairs at the sides. Abdomen yellow, dorsal halves of segments with black bands along posterior part, broadest in middle, narrowed before extremities, increasing in breadth posteriorly, 1st, 7th, and 8th tergites entirely black, the last mentioned with black fringe mixed with yellow; ventral surface pale yellow, valva brownish-black with purple gloss. Legs whitish-yellowish, median and posterior tibia brighter yellow, knees dark brown; tarsi dark brown, posterior half of basal segment and apical rings of these segments yellow. Fore wing with vein 1b furcate to a little before $\frac{1}{2}$, upper parting vein complete, to between veins 8 and 9, lower parting vein present. Elongate, little dilated, broadest at $\frac{4}{5}$. Costa abruptly strongly arched at base, distinctly concave in middle, rounded-prominent at $\frac{4}{5}$, straight posteriorly, apex rounded, termen vertical above, indented on vein 7, prominent between veins 7–4, straight and oblique beneath. Black, tinged purple; a narrow, dark crimson, suffused streak from base to terminal patch, widened in cell, not broader there than about $\frac{1}{7}$ of wing breadth, narrowed at extremities, with a narrow branch along basal $\frac{2}{5}$ of fold; terminal patch orange, yellow below, narrow, its edges scobinate. White markings fine: costal streaks very narrow, dots all of the same size, minute, in regular rows between veins; some minute leaden-metallic scales on crimson streak and on tornal patch. Cilia black with yellow patches on end of veins. Hind wing broadly semiovate, veins 3 and 4 connate, veins 6 and 7 very closely approximated towards base, yellow-orange, markings black, anal half densely covered with large rounded blotches and dots reaching lower edge of cell, connected with each other and arranged in diverging rows parallel to anal veins, apical $\frac{1}{4}$–$\frac{1}{5}$ evenly suffused with smaller black dots, this suffusion connected with anal markings and sometimes partially obscuring them posteriorly. Cilia bright orange-yellow, shining.

Tegumen (Fig. 17) strong, broad. Uncus robust, with broad base and dilated top with two large patches of bristles underneath. Gnathos rather long with slender arms and a strong hook. Socii elongate, almost as long as gnathos. Valva elongate, rather narrow, gradually curved, with costa indicated, broad, cucullus evenly



FIGS. 19–22. Male genitalia of *Cerace*: 19. *Cerace onustana* Moore. 20. *C. stipatana* Walker. 21. *Bathypluta triphaenella* Snellen. 22. *C. cyanopyga* n. sp.

rounded, densely bristled, bristles continued into an oblique dense patch on harpe not reaching to $\frac{4}{5}$ of disk. Saccus rather weak, narrow, bristled along edge and towards base over entire surface. Transtilla membraneous, straight. Aedoeagus short, stout, tubular, slightly curved, with oblique orifice. Cornuti not perceptible. (Gen. No. 585 D., type.)

♀ 48–59 mm. Head, antenna, and palpus as in ♂, white edge of median segment of palpus broader. Thorax paler, white spots much broader, anterior ovate, median triangular. Abdomen: orange-yellow, dorsal bands along apical half of segments brownish-black, scarcely interrupted by ground colour laterally to form a row of subquadrate brownish-black lateral dots; ventral surface pale yellow. Legs as in male. Fore wing with 1c furcate to a little before $\frac{1}{2}$, parting veins distinct, upper to between veins 8 and 9. Shape varying considerably, broader or narrower, costa abruptly strongly arched at base, almost straight in middle, gently curved at $\frac{4}{5}$, straight posteriorly, apex little rounded, termen vertical above, notched on vein 7, prominent between veins 7–5, little curved, oblique beneath. Rather faded purple-blackish, black along costa and often along base; a pale fuscous-reddish discal suffusion from base to tornal patch in middle not broader than $\frac{1}{4}$ of wing, interrupted by rows of white dots and divided by them into 2–3 narrow streaks broader only in cell with a branch along basal $\frac{1}{2}$ of fold, only one of which reaches terminal patch; the latter narrow, especially below, bright orange between 7–6, bright yellow elsewhere, reaching along termen to vein 1c, its edges scobinate, its lower end zigzag; white marking conspicuous, costal fasciae broad and close to each other, dots large, round, of different sizes, arranged regularly, also over discal red suffusion, a few leaden-metallic scales edging white dots above and below on red suffusion and on terminal patch. Cilia black with yellow streaks on veins. Hind wing elongate-ovate, veins as in ♂. Rather dull light yellowish-orange, mostly tinged ochreous, markings dull greyish-black: irregular rounded blotches and dots more or less connected with each other in diverging rows between anal veins below cell, less regular and fewer between terminal veins in apex and along costa; a distinct narrow streak along parting vein, rarely dissolved into a series of dots. Cilia orange-yellow, shining, black dot on end of vein 8 and vein 7, on other veins only faintly suffused with greyish.

7th abdominal segment (Fig. 24) strongly sclerotized, ventrite with a deep emargination in middle. Limen sinuate in middle, with small thickenings at the sides of lower edge. Ostium a broad, strongly sclerotized cup, its narrowed lower part curved to the left and membraneous at that side. Ductus bursae long, coiled above. Bursa copulatrix almost spheroid, large. Signum a concave plate with large dentations. (Gen. No. 573 D.)

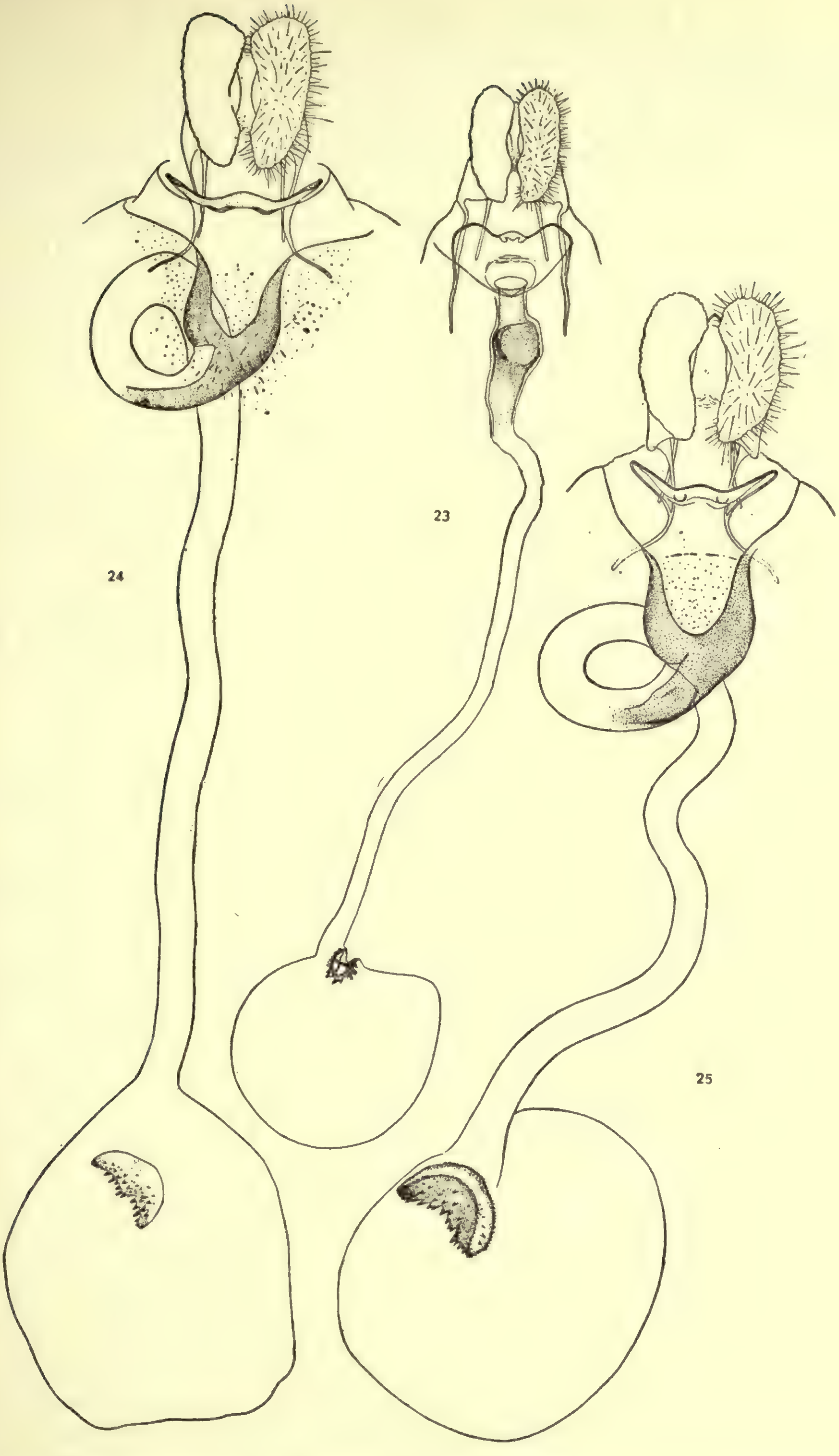
JAPAN, Prov. Yamato, Honshu, 984 ft., 20.x.1900. Nawa Gifu; Komiawa; Kobe, 13.ix.1909; Shimo-Shiiba, Prov. Hyuga, Kyushu 12–13.vii.1893. (*Pryer*, Allotype, in the British Museum (Nat. Hist.), *J. E. A. Lewis*, *A. E. Wileman.*) 10 ♂, 14 ♀. A distinct species closely allied to *guttana*. Unfortunately the male of the latter is not known yet. The female genitalia of the present species and of *guttana* show very little difference, but this may be no objection for the separation of the present species. A long series of both species permits easy separation of the females. The differences may be summed up as follows:

guttana ♀	*xanthocosma* ♀
1. Cilia of hind wing black around apex (from vein 8 or 7 to vein 5).	1. Bright yellow, with only a few very small dots around apex (on veins 8 and 7).
2. Ground colour of hind wing bright golden-yellow.	2. Rather dull light yellowish-orange, mostly tinged ochreous.
3. Markings of hind wing velvety jet-black.	3. Dull greyish-black.

Cerace guttana Felder

Cerace guttana Felder, 1875, *Reise 'Novara' Lepid.* **2:** pl. 139, fig. 51 (♀). Cotes & Swinhoe, 1889, *Cat. Moths. India*, 699, No. 4769. Walsingham, 1900, in Swinhoe, *Cat. Heter. Mus. Oxon.*: **2:** 565. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20. Diakonoff, 1932, *Zoöl. Meded.* **21:** 130–132 (erroneously regarded as conspecific with *onustana* Walker); 1941, *Treubia* **18:** 29.

♀ 53–60 mm. (One specimen 42 mm.—obviously a starveling.) Head white, tuft on vertex and around base of antennae black; collar white, black above, except a white spot in middle. Antenna dark brownish-grey, from above light grey, with black bands, basal segment dark brown. Palpus black, basal segment and lower and apical edge of median white. Thorax purplish-black, anterior white spots large, oval, median triangular, fifth white patch on apex of mesothorax; metathorax dark brown, lateral brushes yellow; lateral half of patagium white, tegulae with an oblique broad white band. Abdomen bright yellow, each segment posteriorly with a broad transverse bluish-black band, gradually narrowed towards extremities; a row of elongate lateral bluish-black spots, anal tuft bright yellow. Legs yellow, basal bands of tibiae and tarsi except apical half of basal segment of median and posterior leg dark brown. Fore wing with 1c furcate to beyond middle, parting veins present, upper to between veins 8 and 9. Narrowly elongate and broadest at ¾: costa abruptly strongly arched at base, faintly prominent before ⅕, somewhat concave before middle, distinctly prominent at ¾, faintly curved and oblique posteriorly, apex rounded, termen almost vertical above, strongly prominent between veins 7–4, straight and oblique beneath. Costa to cell and dorsum to fold bluish-black, disk elsewhere suffused with dark ferruginous-crimson, this area elongate-rhomboidal, broadest beyond middle of wing; terminal blotch elongate, narrow, to vein 1c, little narrowed beneath, yellow, tinged orange only between veins 7–6, with a pair of black dots above, white markings large and coarse: costal fasciae robust, round dots of different sizes, each horizontal row containing dots of almost the same size; a few leaden-metallic shining scales forming upper and lower edge of white dots in crimson suffusion and on terminal patch. Cilia black, yellow with round black dots around tornal patch. Hind wing with veins 3 and 4 mostly connate, seldom separate, veins 6 and 7 mostly shortly stalked, seldom connate, in one specimen separate and approximated towards base; ovate-subtrapezoid; brightly golden-yellow, glossy, dark markings velvety jet-black; except in cell and a little beyond it the wing is covered with irregular rounded dots and blotches, sometimes connected with each other to form irregular bands perpendicular to veins, these markings longer and coarse on terminal area, finer, sometimes forming zigzag lines on anal area between veins; parting vein sometimes with a row of small dots on basal part; seldom a small dark brown suffusion in



FIGS. 23–25. Female genitalia of *Cerace*: 23. *C. tetraonis* Butler. 24. *C. xanthocosma* sp. n. 25. *C. guttana* Felder.

apex. Cilia yellow, black between veins from 8 or 7 to 5, with black basal line continued as far as vein 4 or 3, black dots on veins.

7th segment (Fig. 25) strongly sclerotized, ventrite deeply emarginate. Limen rather broad, curved, with a knob on each side. Ostium strong, broadly cup-shaped above, narrowed beneath and turned to the left, at that side emarginate and membraneous. Ductus bursae coiled, long. Bursa subspheroid. Signum a large, folded plate with rows of strong dentations on inner surface. (Gen. No. 574 D.)

INDIA, Assam, Cherra Punji; Dibrugarh. Sikkim. viii–xi.1888, 1894, 1895. (*Doncaster, Möller, E. F. Badgley.*) 11 ♀. Also recorded from Sylhet, Shillong (and Darjeeling in Sikkim). Type, in the British Museum (Nat. Hist.).

Cerace guttana obscura subsp. nov.

♀. Hind wing with markings more numerous, larger, more densely arranged, forming more or less continuous transverse black bands all over veins; cell with small, more or less continuous markings, reaching to costa; faint blackish suffusion between markings, especially before apex and upper part of termen.

INDIA, Bengal (Type); Darjeeling (*A. Desgodins, Russell*). ISHIGAKI SIMA ISLAND, between Riu Kiu and Formosa, Yayeyama, ix–x.1896. 3 ♀ all in the British Museum (Nat. Hist.). The specimen from Ishigaki Island has the apex of hind wing considerably suffused with blackish-grey.

Cerace myriopa Meyrick

Cerace myriopa Meyrick, 1922, *Exot. Microlepid.* **2:** 497–498 (♀). Caradja, 1925, *Anal. Acad. Române* (3) **3:** 375.

♀ 56 mm. Head white, tuft on vertex except base and edge of eyes purple-black. Antenna blackish, faintly ringed with whitish above (damaged). Palpus white, median segment except lower and apical edge purple-black, apical segment black. Abdomen yellowish white anteriorly, turning bright yellow towards apex, anal tuft yellow; dark brown transverse dorsal bands on posterior halves of segments; a row of lateral longitudinal streaks; ventral surface pale yellow posteriorly, whitish anteriorly. Legs pale yellow, anterior femur purple-black above, tibiae with purple-black apical bands, tarsi purple-black, apical half of basal segment and apical rings on other segments yellow. Fore wing with upper parting vein from half-way between 11 and 10 to base of 8. Very narrowly elongate, little dilated, broadest at $\frac{4}{5}$, costa abruptly strongly arched at base, straight beyond this, gently curved and prominent from beyond $\frac{1}{2}$ to beyond $\frac{4}{5}$, concave before apex, rounded but considerably prominent, as the termen is deeply notched on vein 7, strongly rounded-prominent below this, faintly concave, extremely oblique beneath. Blackish-purple, suffused with black along costa; markings white: numerous dense irregular oblique rather narrow costal streaks, some of them interrupted, others furcate or not reaching costal edge; numerous horizontal series of white dots, more or less confluent into almost continuous white streaks posteriorly; brick-red discal suffusion forming a streak in fold from before base to $\frac{1}{2}$, a broader streak in disk above middle from before base to before termen, very narrow posteriorly and a third narrow streak from middle of disk to terminal blotch along upper edge of cell and vein 6; white markings on crimson suffusion edged above and beneath with violet-leaden shining scales; terminal blotch elongate, crimson, orange posteriorly, between veins 6 and 5 orange-yellow, below becoming interrupted into round pale yellow dots, which reach termen. Cilia black, with orange spots on veins 6–5, yellow spots on veins 4–2 and in tornus. Hind wing whitish, apical half suffused with pale yellow, brighter posteriorly; irregular greyish-brown transverse blotches, becoming black towards apex, scattered along termen and over anal area below cell, a row of round dots along costa and basal half of parting vein; a pair of small dots between cell and termen, a series of such dots on apical and upper part of terminal edge of wing. Cilia yellow, paler on dorsum.

7th ventrite (Fig. 27) strongly sclerotized, with a narrow deep emargination posteriorly. Limen moderately broad, strongly curved, without knobs. Ostium a rather narrow deep cup, narrowed and turned to the left below, partially membraneous at that side. Ductus bursae coiled, rather long. Bursa copulatrix a folded dentate plate. (Gen. No. 575 D.)

CHINA, Ichang, Chang-Yang, 4,000–6,000 ft., 1886 (*Pratt*). 1 specimen. Closely allied to *guttana* but immediately separable by whitish basal half of hind wing. Type specimen from Tse-Chuan (Szechuen) in the Muséum National d'Histoire Naturelle at Paris.

Cerace mesoclasta Meyrick

Cerace mesoclasta Meyrick, 1908, *Rec. Indian Mus.* **2:** 395 (♀); 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20.

The author did not study this species. The original description is as follows:

'♀. 41 mm. Head white, collar purple-blackish edged with white. Palpi white, with a grey streak along upper edge of second joint except at apex, terminal joint grey. Antennae dark grey ringed with white. Thorax dark purple-fuscous, with five white spots, patagia edged with white. Abdomen blackish, segmental margins light ochreous-yellow, apex orange. Fore wings elongate, narrow, rather dilated posteriorly, costa gently arched, apex very obtuse, termen rounded so as to project rather beyond apex; dark purple-fuscous, covered with rows of numerous small whitish spots between veins, towards costa united into transverse strigae which become larger towards base; in the middle of disc these spots coalesce into a longitudinal streak; an elongate orange spot on termen, extending from vein 2 to 6; cilia dark fuscous (imperfect). Hind wings whitish; a fuscous blotch suffusedly spotted with dark fuscous occupying apical fourth of wing; a row of dark fuscous spots along costa; about three rows of dark fuscous spots extending over dorsal area of wing from base to apical blotch, smaller towards base; cilia white, round apical blotch mostly dark fuscous.

'Kurseong, E. Himalayas, at 5,000 ft., in May; one specimen. Nearest *C. stipatana*, but easily known by the discal white streak, less extensive orange patch, spotted dorsal area of hind wings, and blackish-banded abdomen. In the specimens described veins 6 and 7 are short-stalked in one fore wing by an abnormality, the other wing being quite normal.'

According to the colouring of the hind wing the present species may be allied to *myriopa*. The type is not in the British Museum (Nat. Hist.). Probably it is in the Indian Museum at Calcutta.

Cerace onustana Walker

Cerace onustana Walker, 1863, *List Lepid. Brit. Mus.* **28:** 423. Moore, 1867, *Proc. Zool. Soc. Lond.*: 668. Cotes & Swinhoe, 1889, *Cat. Moths India*: 699, No. 4770. Meyrick, 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20. Wisherd & Murrayama, 1929, *Nat. Geogr. Mag.* **56:** 73, pl. 16, fig. 6. Matsumura, 1931, *6000 Illustr. Ins. Japan*: 1067, fig. 2127 (♀). Diakonoff, 1941, *Treubia*, **18:** 30, pl. 3, fig. 3 (genit. ♂).
Cerace guttana, Diakonoff (*nec* Felder), 1939 (*ex errore*), *Zoöl. Meded.* **21:** 132.

♂ 39 mm. Head white, tuft on vertex and edge of eyes above black; collar white, black above, except in middle. Antenna black, shaft white above except on base of segments. Palpus black, basal joint and apex of median white, lower edge of median mixed with whitish scales. Thorax purplish-black, somewhat mixed with white scales (damaged), two pairs of lateral white spots, a white spot on apex of mesothorax; metathorax blackish with a yellow pencil of long hairs on each side. Abdomen orange-yellow, light yellow on ventral surface, 1st tergite black, other tergites with an ovate large black spot in middle, spots increasing in size towards apex; anal tuft black, a row of lateral spots and 8th segment with a pair of subapical latero-ventral spots. Legs yellow, knees and base of tibiae black, tarsi black, anterior basal segment with an apical yellow ring, median and posterior basal segments with apical half yellow. Fore wing with vein 1b furcate along its basal half, upper parting vein to between veins 7 and 8, lower parting vein weak. Narrowly elongate, little dilated, broadest at $\frac{4}{5}$; costa curved at base, straight in middle, slightly projecting at $\frac{4}{5}$, faintly concave before apex, apex rounded, termen vertical above, strongly obliquely projecting between veins 7–5, oblique and straight beneath. Purplish-black, turning jet-black posteriorly; central part of disk narrower than $\frac{1}{3}$ of wing breadth with a dark ferruginous-crimson suffusion narrowed beyond middle of wing, scarcely reaching terminal spot, with a short branch in fold from cell half-way towards wing edge and a shorter indistinct branch along base of vein 12; terminal spot small, orange, paler below, narrowed there and almost dissolved into a series of blotches; markings white: costal streaks narrow, remote from each other, dots almost of the same size, in regular horizontal rows; some dots before middle of termen on and before terminal spot covered with shining violet-metallic scales. Cilia black mixed with white scales (damaged). Hind wing elongate-ovate, with veins 3 and 4 connate, 6 and 7 connate. Bright yellow, marginal half with sparse irregular jet-black dots and marks in two rows: larger posteriorly, smaller anteriorly; apical $\frac{1}{5}$ of wing with brownish-black suffusion, almost entirely obscuring black marks there, its anterior edge concave, little suffused, to tip of vein 1c. Cilia black along dark suffusion, yellow elsewhere.

Tegumen (Fig. 19) strong, erect. Uncus rather long with two long bristles at the top, haired underneath. Gnathos long, its hook dilated. Socii elongate, as long as gnathos. Valva elongate, dilated posteriorly; costa indicated, cucullus obliquely rounded, with dense bristles, harpe densely bristled following the edge of valva. Sacculus narrow, bristled towards base. Aedoeagus rather long, stout, tubular and straight. Cornuti not perceptible. (Gen. No. 584 D.)

INDIA, Assam, Khasias, x.1894. The type is from Nepal. 4 ♂.

♀ 50–60 mm. Head white, tufts around and between base of antennae black; collar white with two dorsal black patches. Antenna blackish-brown, light grey, ringed black above. Palpus black, basal segment and lower and apical edge of median with a rather broad white edge. Thorax purplish-black with blue sheen, lateral half of patagium, a streak on tegula, large ovate anterior, triangular median and apical spots white; mesothorax dark brown with yellow tufts. Abdomen bright yellow, each segment with a broad posterior transverse blackish-purple band, narrowed laterally and a narrowly-elongate lateral patch; anal tuft bright yellow. Legs yellow, tibiae with basal bands and tarsi, except the anterior, with apical half of basal segments dark brown. Fore wing with 1c furcate to beyond middle, parting veins present, upper to between veins 8 and 9. Narrowly-elongate, costa considerably but not abruptly curved at base, almost straight before middle, prominently gradually rounded at ¾, slightly concave beyond, apex rounded, termen vertical above, notched on vein 7, strongly prominent between veins 7–4, straight, very oblique beneath. Purplish-black along costa to cell, along dorsum to fold and posteriorly to vein 4; disk elsewhere suffused with dark ferruginous-crimson, forming 3 narrow streaks between rows of white dots and another one in basal half of fold; terminal patch narrow, forming a streak to 1c, rather pale yellow, tinged orange between veins 6–7; a few metallic scales in crimson suffusion and in terminal patch. Cilia black, white streaks on veins. Hind wing elongate-subtrapezoid, rather narrow, yellow, markings purplish-black: irregular dots and blotches all over the wing arranged in garlands transversely to veins, broader posteriorly, abruptly narrowed on cell and costa; a dark purplish-brown suffusion from costa to anal angle extended over about ⅖ of wing breadth. Cilia dark grey, blackish with a black basal line around apex, yellow along anal edge.

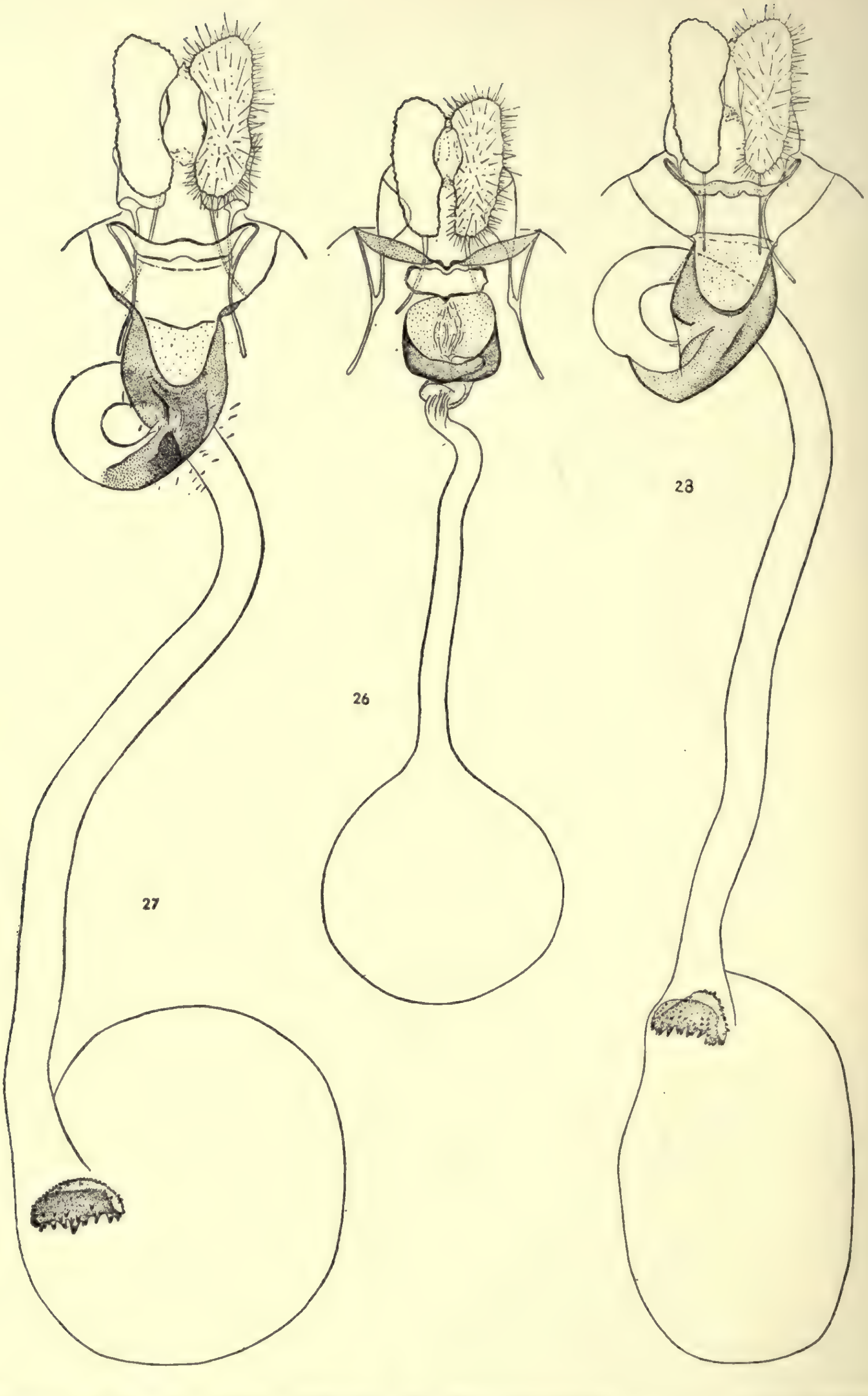
7th ventrite (Fig. 26) little sclerotized. Limen broad at the sides, narrowed in middle, folded in the shape of a V. Ostium a strong broad and shallow cup, abruptly narrowed into a short tube. Ductus bursae narrow, rather short, with finely scobinate wall. Signum absent. (Gen. No. 607 D.)

INDIA, Sikkim: Darjeeling; Bengal (*R. P. Bretaudeau*, 1884). 3 specimens. Also recorded from Japan (*Wisherd & Murrayama*, 1929; *Matsumura*, 1931), but possibly these records refer to *xanthocosma*. The ♀ genitalia of this species differ considerably from those of *guttana*. Type in the British Museum (Nat. Hist.).

Cerace cyanopyga sp. nov.

κυάνεος = dark blue, πυγή = rump

♂ 44 mm. Head white, tuft of long hair-scales around base of each antenna black. Antenna dark brown, flagellum with broad white bands on upper side, cilia whitish. Palpus black, basal segment throughout, and median segment along under side, except in middle and around apex white. Collar of scales around head white. Thorax black with two pairs of white erect spots at the sides and one on apex; patagium white, tip black, tegula black with an oblique white fascia; metathorax with a large yellow spot on each side. Abdomen orange, 1st segment suffused with blackish, other segments each with a bluish-black dorsal band along posterior edge and a lateral dot. Valva bluish-black, cilia dark grey mixed with white. Legs orange, base of tibiae, basal half of 1st tarsal segments and other tarsal segments bluish-black. Fore wing



Figs. 26–28. Female genitalia of *Cerace*: 26. *C. onustana* Moore. 27. *C. myriopa* Meyrick. 28. *C. xanthothrix* sp. n.

elongate, rather narrow, broadest at $\frac{3}{4}$, both parting veins developed, upper to base of vein 8. Costa strongly curved at base almost straight along middle half, bluntly projecting at $\frac{3}{4}$, from there straight and oblique to apex, apex subacute, projecting between veins 7 and 8, termen deeply notched on vein 7, rounded and considerably projecting between vein 7 to 4, very oblique below. Black, middle third of wing crimson-ferruginous from base to before termen, somewhat narrowed there. Markings white: somewhat curved oblique streaks on costa, reaching about $\frac{1}{3}$ across wing, numerous rounded dots arranged in longitudinal rows scattered all over the wing except on costa, on narrow distal part of ferruginous suffusion and before termen; a large dark orange preterminal patch connected with above-mentioned suffusion reaching downward along termen to vein 2, its edges serrate; several round violet-metallic shining dots in middle of disk before termen and a few shining scales partially edging several white dots in disk. Cilia bluish-black, with about 5 whitish patches along termen below vein 7. Hind wing elongate—semiovate, rather narrow towards apex, veins 3 and 4 connate. Bright orange, markings black: an erect semiovate rather large apical patch; round spots of different sizes from this to tornus arranged in two rows. Cilia orange, black around apex.

Tegumen (Fig. 22) moderately broad. Uncus strong, its top erect-ovate, with two long patches of bristles underneath. Gnathos moderate, with slender arms and a long slender curved hook. Socii narrow, elongate, not reaching hook of gnathos. Valva elongate, rather broad, costa evident, cucullus rounded above, very oblique beneath gradually densely fine-bristled, with harpe obliquely rounded, very densely covered with strong bristles. Saccus with broad, flattened, long-bristled base, indefinite posteriorly. Transtilla broad, membraneous, straight, somewhat narrowed in middle. Aedoeagus broad, stout, tubular, slightly curved, with dilated and obliquely truncate apex. (Gen. No. 583 D., type.)

BURMA, Maymyo, 11.v.1901 (*H. J. W. Barrow*). 1 specimen, type, in the British Museum (Nat. Hist.). Nearest to the following.

Cerace ios Diakonoff

Cerace ios Diakonoff, 1939 *Treubia* **18:** 30, pl. 1, fig. 1.

♀ 45·5 mm. Head yellow. Antenna black, yellowish ringed. Palpus black, with basal segment and the base of terminal yellow. Thorax yellow, a round ferruginous dot on tegula and in middle of anterior edge. Abdomen yellow. Legs yellow with black articulations; anterior and median tarsi black yellow-ringed, posterior tarsus with base of basal segment black. Fore wing with costa strongly but regularly arched as far as $\frac{1}{3}$, straight posteriorly, gradually curved beyond middle, slightly convex before apex, apex bluntly prominent, termen concave beneath apex, then prominently rounded in cells 7–5, oblique beneath. Yellow-orange, reticulate with ferruginous-violet: on basal half of wing ground colour predominates, yellow blotches being larger than ferruginous bands and stripes; on terminal half of wing and along dorsum yellow colour reduced to round spots, and dark markings predominate; dark markings black along costa and dorsum; a row of transverse strigae on costa, reaching to $\frac{1}{3}$ of wing breadth at base, gradually decreasing in length, but increasing in breadth towards apex; a round yellow dot before apex; elsewhere the wing scattered with round yellow blotches, arranged in horizontal rows and decreasing in size posteriorly; termen red in cells 7–3. Cilia red with some 6 black semicircular dots. Hind wing bright yellow-orange, paler at base, terminal ⅓ black, anterior edge of this black area somewhat diffuse, sinuate; black rounded dots on lower half of wing, decreasing in size towards termen. Cilia yellow, black around terminal ⅓ of wing.

NORTH-EAST BORNEO, Mt. Kina Balu. Unique. Type in Universitätsmuseum, Berlin (ex Coll. Staudinger.) The specimen could not be obtained for the present study. In the original description the word 'patagium' must be changed into 'tegula' (lapsus).

Cerace xanthothrix sp. nov.

ξανθόθριξ = golden-yellow haired

♂ 33–38 mm., ♀ 48 mm. Head white, face edged black, in ♀ slightly suffused with ochreous, tufts between antennae black, white at base. Antenna (damaged) blackish, white-ringed. Palpus black, basal segment and lower and apical edge of median segment white. Thorax ferruginous-blackish with two pairs of lateral spots and apex white, metathorax with a pair of lateral spots white in ♂, yellow in ♀, tegula with an oblique white fascia. Abdomen yellow or orange-yellow, brighter posteriorly, pale yellow beneath, anal tuft in ♀ yellow-orange, ♂ with a blackish-grey or bluish-black spot on 8th tergite, valva brownish-black with a violet sheen, edged with yellow beneath. Legs: anterior whitish, tibia suffused with black along upper half, median tinged with ochreous, posterior ochreous-yellowish: knees dark brown, tarsal segments with dark brown base. Fore wing with both parting veins developed, upper to between base of 8 and 9; elongate-ovate, much broader in ♀ (♂ 3·2 ×, ♀ 2·7 × as long as broad). Costa abruptly strongly arched at base, in middle slightly concave in ♂, straight in ♀, at ⅘ bluntly angulate in ♂ (less distinct in ♀), straight and oblique before apex, apex shortly rounded, termen notched on vein 7, considerably obtusely projecting between veins 5 and 6, very oblique beneath. Blackish-violet, suffused with black along costal ⅓; a narrow streak of brick-red suffusion just above middle of disk from base to termen, another such streak along basal ⅗ of fold; terminal patch bright orange, paler below, with four small semiovate dots on termen; other markings white: costal streaks somewhat sinuate, on posterior half of wing irregular, dissolved in dots; rows of dots all over the wing, rather large and coarse, irregular; violet-metallic scales in red discal suffusion edging white dots from below; a few black dots on preterminal area. Cilia black, blotched black and white with orange base around terminal patch. Hind wing with 3 and 4 almost connate in ♂, separate in ♀, broadly subtrapezoid. Bright orange in ♀, paler in ♂; posterior ⅖ of wing brownish-black with violet gloss and faint yellowish spots: with anterior edge concave, serrate above, more or less dissolved in a few irregular transverse blotches and dots between veins 3 and 1b, on terminal edge reaching not far beyond vein 2. Cilia with alternating white and black patches around black area, a narrow basal line black; yellow or orange elsewhere.

Tegumen (Fig. 18) moderately broad, rather high. Uncus strong, with elongate-ovate top, two patches of bristles underneath. Gnathos with moderately broad arms and a strong dilated hook. Socii broad, reaching to ⅔ of gnathos. Valva elongate, moderately broad, with costa evident, cucullus oblique beneath, rounded above, densely bristled, bristles on harpe in a dense patch obliquely to ⅘ of disk. Sacculus moderately broad, weak, sparsely bristled. Transtilla membraneous, straight, narrow. Aedoeagus stout, short, tubular, with dilated top and obliquely truncate orifice. (Gen. No. 577 D., holotype; No. 578 D., paratype.)

7th segment (Fig. 28) sclerotized, with a rather broad emargination on ventral side. Limen moderately broad, with edges scobinate, upper straight, lower twice emarginate, without knobs. Ostium broad, strong, cup-shaped above, narrowed and turned to the left beneath, emarginate and membraneous at that side. Ductus bursae coiled, long. Bursa copulatrix ovoid. Signum a folded plate with large strong dentations on inner side. (Gen. No. 576 D., allotype.)

INDIA, Assam, Naga Hills, Golaghat, 1890 (*Doherty*), Walsingham Coll. No. 40224 (holotype) and 40225 (allotype); BURMA, Karen Hills (*P. T. H. G.*), v. 1923, Archbald Coll.; 2 ♂, 1 ♀; all in Brit. Mus. (Nat. Hist.) Nearest to *stipatana* Walker, but recognizable by the colour of hind wing, by the shape of fore wing, and by the genitalia.

Cerace stipatana Walker

Cerace stipatana Walker, 1863, *List Lepid. Ins. Brit. Mus.* **28:** 422–423. Moore, 1867, *Proc. Zool. Soc. Lond.*: 688. Cotes & Swinhoe, 1889, *Cat. Moths India*: 699, No. 4771. Meyrick, 1894, *Trans. R. Ent. Soc. Lond.*: 24; 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20, pl. 3, fig. 31, pl. 5, fig. 74; 1914, *Ent. Mitt.* (Suppl.) **3:** 47. Matsumura, 1931, *6000 Illustr. Ins. Japan*: 1067, fig. 2128 (♀). Caradja, 1938, *Stettin. Ent. Ztg.* **99:** 257 (*Ceraca stipatana*, err.); 1925, *Anal. Acad. Române* (3), **3:** 375. Fletcher, 1929, *Mem. Dep. Agric. India, Ent.* **11:** 43. Diakonoff, 1939, *Zoöl. Meded.* **21:** 130, figs. 1 A–B, 2 A–C; 1941, *Treubia* **18:** 29.

Head (Figs. 13, 14) white, face narrowly edged above and below with black, flattened tuft between and around bases of antennae bluish-black; collar white. Antenna black, ringed with white except along anterior side, cilia greyish. Palpus black, basal segment and median segment edged white below and at apex. Thorax purplish, two larger ovate white spots anteriorly, two smaller ones posteriorly at the sides of mesothorax, an oblique white streak on each tegula; metathorax dark brown with a large whitish or yellow pencil of hairs on each side. Abdomen pale yellow anteriorly, yellow-orange posteriorly, ♂ with posterior edge of 8th segment and posterior half of 9th segment purplish-grey, valva purple-black or purplish, more or less mixed with yellowish along upper and lower edge. Legs in ♂ pale yellow, in ♀ anterior whitish, other yellow-orange; anterior suffused with dark purplish-grey from above, except apex of tarsal segments, other with knees and basal halves of tarsal segments dark purplish-grey. Fore wing (Fig. 13) with vein 1b furcate to a little beyond middle in ♂, to a little before in ♀; both parting veins present, upper ending between veins 8 and 9, or at base of 8; terminal veins long, slightly sinuate; elongate-ovate, rather narrow, broadest at ⅗, the shape of wing slightly variable: sometimes broader, more dilated posteriorly, or narrower, less dilated; costa strongly arched at base, straight in middle, distinctly projecting at ⅗, straight beyond this, apex little rounded, termen almost vertical, between veins 8 and 7 strongly prominent, subacute between veins 7–5 (accessory apex between 6 and 5), little rounded and oblique below. Purple-black, more or less suffused with crimson-purple in middle of disk from base to before termen. Markings white, rather variable: transverse oblique streaks on costa varying in size, some of them furcate above or below decreasing in length posteriorly, mostly interrupted into short streaks and dots on posterior half of wing; elsewhere horizontal rows of round dots of various sizes, not reaching termen, arranged more or less between veins, a bright orange irregular blotch on termen between veins 2–7 with 1–2 black dots, narrowed and paler below, its anterior edge irregularly scobinate, about three black dots on terminal edge, corresponding with black dots on cilia. Cilia dotted black and white. Hind wing in ♂ semiovate, apex gradually rounded, in ♀ ovate-subtrapezoid, slightly variable in shape, apex subtruncate. White, markings black, mostly tinged brownish and more or less suffused with dark brownish-grey or blackish-grey: posterior $\frac{1}{3}$ to $\frac{1}{2}$ black, its anterior edge variable in shape, mostly little suffused, often more or less dissolved into transverse blotches and dots, sometimes black suffusion reaching to anal angle; base of wing with blackish suffusion on veins seldom connected along lower edge of cell, with black terminal part. Cilia white with black patches on ends of veins.

Tegumen (Fig. 20) short and broad. Uncus with top rounded and covered with strong bristles on the underside. Hook of gnathos with a long sharp point. Socii not reaching hook of gnathos. Valva rather narrow, little dilated, cucullus obliquely rounded, its top rather narrow, harpe long, densely bristled. Sacculus narrow, densely bristled at the lower side. Transtilla narrow, straight, slightly dilated at extremities. Aedoeagus somewhat curved at base, dilated posteriorly with an obliquely truncate apex. Cornuti not perceptible. (Gen. No. 587 D., the specimen figured from Khasi Hills, Swinhoe Coll.)

7th segment (Fig. 29) strongly sclerotized, ventrally with a deep and broad emargination. Limen broad, median plate with two small projections above, twice slightly indented below. Ostium broadly cup-shaped, narrowed and curved to the left below, emarginate and partially membraneous at that side. Ductus bursae coiled, long. Bursa copulatrix subovoid. Signum a folded plate with large dentations on inner side. (Gen. No. 578 D.)

The study of the male genitalia revealed that the rather heterogeneous looking material represented only one species, with a distinct tendency, however, to the formation of regional subspecies. The material was suffiicient to permit recognition and separation of some of these, but not abundant enough to enable decisions to be reached on the status of some of the intermediate forms. We do not endeavour, therefore, to give a key to the subspecies described below, but refer to the descriptions concerned.

Cerace stipatana birmensis subsp. nov.

♂ 38–47 mm. Fore wing with dark markings deep black; hind wing with dark area jet-black, sharply edged, mostly not reaching vein 1b, scarcely suffused along anterior edge, which is sometimes dissolved into round dots below and has a rounded excavation above middle sometimes followed by a rounded short and blunt projection between veins 2 and 3.

♀ 48–60 mm. Mostly brightly coloured, fore wing with black markings as in ♂; mostly broad, considerably dilated at ⅗, but also narrow-winged females occur. Hind wing elongate subtrapezoid, truncate; dark area jet-black, mostly not reaching beyond vein 1c, its anterior edge dissolved throughout into irregular well-defined blotches and short streaks along veins, not reaching cell, scarcely suffused at all, below forming 2–4 series of transverse more or less continued streaks and blotches.

Holotype and allotype: BURMA, Ruby Mines District, xi.1922; paratypes: BURMA, Momeit, 2,000 ft.; Karen Hills, 3,000 ft.; Maymyo. vi.1890, 1910, 15–23.vi.1916, (*Doherty*, *Andrews*). 2 specimens without locality label. 10 ♂, 6 ♀. A distinct form, characterized by limited, well-defined jet-black area in hind wings of both sexes, and the large size of the female. Types in the British Museum (Nat. Hist.).

Cerace stipatana clara subsp. nov.

♂ 37–46 mm. Dark markings black, often faintly brownish tinged. Hind wing with dark area less purely black than in foregoing, its anterior edge mostly gradually curved throughout, more or less suffused and often forming irregular serrations on veins throughout, although without a distinct rounded projection below middle; reaching always beyond vein 1b, often as far as vein 1a, often 1b suffused with black throughout.

♀ 41–55 mm. Rather variable and near to the foregoing. Hind wing of slightly variable shape, but broader and shorter, less bluntly truncate, more rounded than in *birmensis*; dark area brownish-black, paler, its anterior edge irregularly dissolved into blotches, sometimes considerably suffused between these with dark brownish-grey, especially below.

Holotype: INDIA (*H. M. Parish*); allotype: Sikkim, 1,000–4,000 ft. (*Möller*); paratypes: INDIA: Sikkim, Darjeeling; Kurseong; Mund, 1,000–4,000 ft., Jamtu Hills, '87. Assam, Naga Hills, Golaghat. BHOTAN. 24.iv.1894. (*R. P. Bretaudeau*, *Doherty*, *Dudgeon*, *Pilcher*.) 8 ♂, 23 ♀. Types in the British Museum (Nat. Hist.).

Cerace stipatana formosana subsp. nov.

♀ 49–53 mm. Hind wing elongate-subtrapezoid, apex rather rounded. Dark area brownish-black, narrow, not reaching ¼ across wing (scarcely half-way towards cell), its anterior edge angularly excavate in middle, irregularly serrate and dissolved into blotches below, not reaching beyond 1 b. Otherwise as preceding.

FORMOSA, Koshum; Gyocha, vi.1907 (*A. E. Wileman*). 2 specimens. This form has the most limited dark area in hind wing. Type in the British Museum (Nat. Hist.).

Cerace stipatana stipatana Walker

♂ 38–45 mm. Rather darkly coloured, yet dark markings in both wings brownish tinged, not pure black. Hind wing with dark area reaching over ⅖, broader in apex, somewhat more abruptly narrowed below, altogether more extended than in *clara*; its anterior edge mostly forming two distinct teeth on veins 2 and 3, the latter reaching to angle of cell, and round dots below, connected by dark grey suffusion; sometimes entire edge gradually suffused, in 2 specimens this suffusion covers anal cells entirely and runs along lower edge of cell to base.

♀ 50–56 mm. Hind wing with dark area extended over $\frac{1}{3}$ of wing at apex, reaching to angle of cell on termen, its anterior half forming numerous round black dots connected with dense blackish-grey suffusion which often reaches to anal angle; often lower edge of cell and anal veins faintly suffused; mostly long teeth on veins 2 and 3.

Type: INDIA, Sylhet; Assam, Khasia Hills, Cherrapunji, v, vi.1887, 1894, 1895. CHINA, Chung King; Kiang Si. 1894, 1911 (*B. Barry*, *C. Bock*). 19 ♂, 7 ♀. 3 smaller females (47 mm.) from Khasias with less suffused markings in hind wing are perhaps intermediate forms between the present and *clara*; 3 ♀ from China are smaller: 50–53 mm. Otherwise uniform and distinct. Type in the British Museum (Nat. Hist.).

Cerace stipatana exul subsp. nov.

♂ 39–41 mm. Hind wing with dark area as large as in *clara*, but the anterior edge with a rounded excavation above middle, followed by a projection crowned by two long teeth on vein 2 and 3, all the more distinct as it is followed by a small indentation; a dark grey suffusion below continued to anal angle.

♀ 50 mm. Hind wing with anterior edge of black area roundly excavate above middle, reticulate by small connected blotches below, scarcely reaching beyond 1b. Otherwise very much like *clara*.

Holotype, allotype: CHINA, Chusan Island, ix.1892. 3 ♂, 1 ♀. Types in the British Museum (Nat. Hist.).

Cerace stipatana sinensis subsp. nov.

♂ 41–43 mm. Darkly coloured, white markings in fore wing rather fine. Hind wing with dark area pure black, reaching at apex beyond $\frac{1}{3}$ of wing, mostly little narrowed below, reaching beyond anal angle, its edge suffused, veins 7 and 6 and upper edge of cell, veins 4, 3, 2, lower edge of cell and anal veins except 1c more or less distinctly suffused, especially lower edge of cell and vein 1b suffused throughout; anterior edge of black marginal area with long teeth on all terminal veins, especially distinct on 3, 2, and 1b.

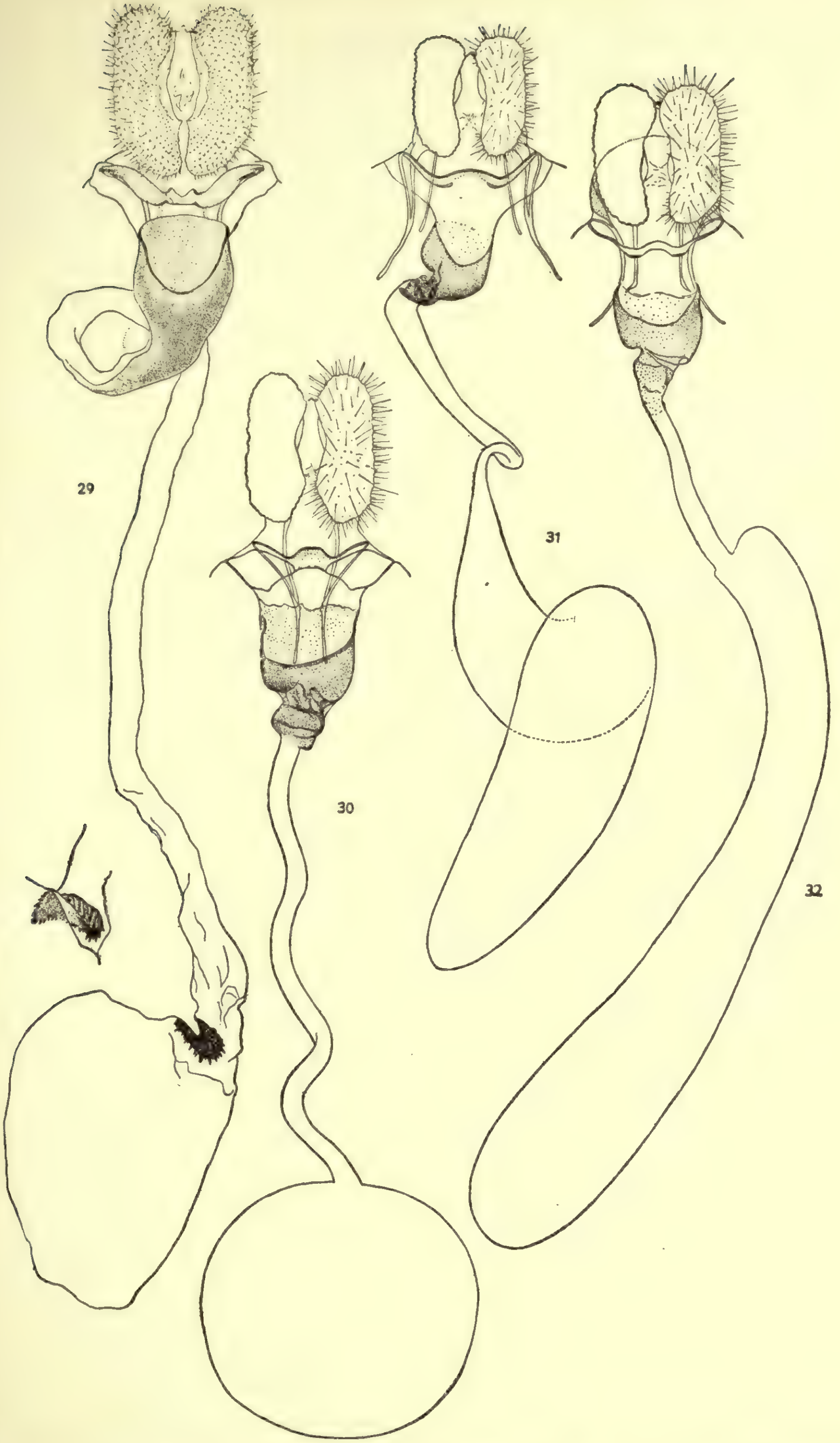
♀ 49–51 mm. Hind wing rather narrowly subtrapezoid, dark area suffused and reminiscent of typical *stipatana* but with veins finely but distinctly suffused throughout; terminal suffusion reaching to anal angle.

Holotype: CHINA, Ichang, Chang Yang, 4,000–6,000 ft., allotype: Sze Chuen, Chia Kou Ho, 1886 (*Leech*). Uniform and characteristic of the genus. Types in the British Museum (Nat. Hist.).

Cerace sardias Meyrick

Cerace sardias Meyrick, 1907, *J. Bombay Nat. Hist. Soc.* **17:** 748; 1912, in Wagner, *Lepid. Cat.* **10:** 15; 1913, in Wytsman, *Gen. Ins.* **149:** 20. Diakonoff, 1939, *Treubia*, **18:** 29, pl. 3, fig. 2. (Genit. ♂.)

♀ 40–42 mm. Head, thorax, and abdomen bluish-black, purple-shining, the latter with bright yellow patches or broad bands on the sides of segments 3–7 anteriorly.



FIGS. 29–32. Female genitalia: 29. *Cerace stipatana* Walker. 30. *C. sardias* Meyrick. 31. *Bathypluta metoeca* sp. n. 32. *B. triphaenella* (Snellen).

Palpus dull brownish-black. Antenna blackish, shaft whitish-ringed and suffused with whitish along apical half above. Abdomen purple-black, segments 1–6 with subquadrate bright-yellow lateral spots. Legs purple-black, apex of tibiae suffused with whitish above. Fore wing with upper parting vein to between 8 and 9. Elongate-ovate, costa considerably curved throughout, stronger at extremities, apex very rounded, little distinct, termen slightly obliquely concave on vein 7, prominent between veins 6–4, almost straight and oblique below. Bright yellow; base of wing with a bluish-black shining streak, slightly dentate on fold; a suffused purplish-black transverse fascia, its anterior edge sharply marked, edged with fine leaden-metallic scales from middle of costa to dorsum beyond ⅔, with two large excavations or indentations above fold, a smaller, less distinct indentation below fold; its posterior edge suffused, concave, extended along costa and dorsum to tornus, continued in a narrow marginal black line; terminal area dark purple-crimson, scattered rather irregularly with round dots of dark leaden-metallic shining scales, the largest along costa; one or two small yellow dots on costa at ⅗. Cilia purple-black. Hind wing broadly semi-ovate, veins 3 and 4 closely approximated or connate, 6 and 7 closely approximated towards angle or connate. Bright yellow, apical ⅓ dull brownish-black, inner edge of this area almost straight, little oblique to end of 1c, mostly emarginate below 6, often irregularly serrate. Cilia black around dark area, yellow mixed with black between 1c and 1a, pale yellow on dorsum.

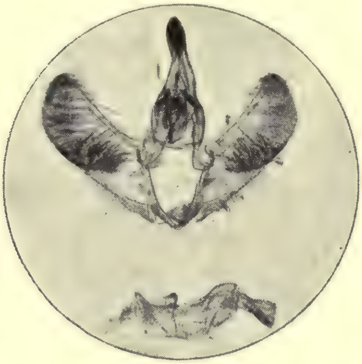


FIG. 33. *Cerace sardias* Meyrick, male genitalia. (By courtesy of the Editors of *Treubia*.)

7th segment (Fig. 30) somewhat sclerotized posteriorly with a broad, deep emargination ventrally. Limen narrow, curved at the sides, twice emarginate in middle. Ostium very broad, strong, cup-shaped, broadly emarginate ventrally, with a split dorsally, abruptly narrowed below. Ductus bursae moderate, very narrow. Bursa copulatrix large, subspheroid. No signum. (Gen. No. 612 D.)

INDIA, Assam, Khasias, Cherrapunji, xi.1894, 1895 (*Doncaster*). 3 ♀. Type in Meyrick's collection in the British Museum (Nat. Hist.). The only male specimen of this species (from Upper Assam, in the Universitätsmuseum at Berlin) is much smaller than the above-mentioned females, but with the same colouring and markings. The description of the male genitalia (Fig. 33) is as follows:

> 'Tegumen moderately broad, rather short, saccus rounded-angular. Valva elongate, broadest at base, its edges parallel posteriorly, apex oblique, covered with long bristle-hairs along lower part of posterior half, anteriorly these bristles very strong. Costa indicated, rather narrow sacculus indefinite, with a few short hairs. Uncus narrowed below top, its base dilated triangularly, its top rounded-ovate, with two rows of bristles below. Socii rather long, with narrow base, dilated beyond middle, hairy; reaching to ⅔ of gnathos, which is robust, moderately long, with strongly curved point. Transtilla moderate, dilated in middle. Anellus moderate. Aedoeagus short and broad, its top produced below, with oblique orifice. Cornuti not perceptible (broken off?). (Slide No. 144 D).'

BATHYPLUTA gen. nov.

βαθύπλουτος = very rich

Head (Fig. 34) smooth, a short flattened crest on vertex encircling the base of antennae, depressed in middle. Ocelli posterior. Proboscis short. Antenna scarcely ½, fasciculate-ciliate in ♂, finely ciliate in ♀, scape stout, short. Palpus short, porrect, median segment smooth above, with a short rough fringe of scales below, not dilated, terminal segment very short, obtuse, sometimes almost concealed. Thorax and legs smooth. Fore wing (Fig. 34) without costal fold in male, rather narrow, elongate-ovate, costa abruptly curved at base, slightly concave in middle, distinctly prominent at ⅔, apex slightly obliquely notched on vein 7, termen acutely prominent below notch. All veins separate, 1b furcate along basal ⅓ or a little beyond this, 2 from beyond ⅔ of lower edge of cell, 3 from angle, 4 somewhat approximated or rather remote, 5 parallel to 4, widely remote from 6, 7 to notch of termen, 9 and 10 tolerably parallel, 11 from about ½, upper parting vein to between 8 and 9, lower parting vein present. Hind wing elongate-subtrapezoid, without cubital pecten. 1b shortly furcate at base, 2 from ⅔, 3 from angle, 4 absent, 5 approximated to 3 at base, 6 and 7 connate, seldom closely approximated towards base; parting vein weak, to middle of angulate discoidal.

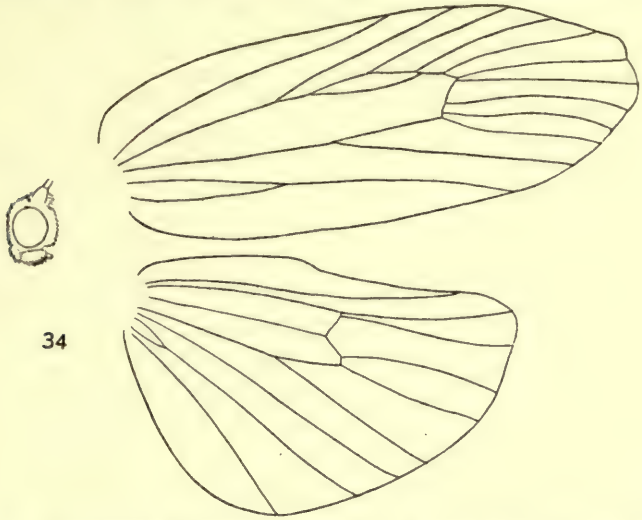


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FIG. 34. *Bathypluta triphaenella* (Snellen), ♀ wing neuration and head.

Type species *Cerace triphaenella* Snellen.

A development of *Cerace*. The neuration of the hind wing, the shape and the typical colouring of the fore wing justify the separation of this genus.

KEY TO THE SPECIES OF *Bathypluta*

1. Fore wing with ground colour dark brownish-black scattered with bluish-leaden patches and dots . . . . *triphaenella nox*
Fore wing with ground colour not thus 2

2. Fore wing blackish-brown, apical ⅖ reddish, suffused with yellowish *triphaenella melanoptera*
   Fore wing with ground colour reddish-ferruginous or orange . . . 3
3. Hind wing rather narrow, elongate-subtrapezoid, termen concave below apex, terminal band little narrowed, running to anal angle . *triphaenella sparna*
   Hind wing broad, elongate-semiovate, termen scarcely concave, terminal band narrowed below, to vein 1b 4
4. Costal marks in fore wing numerous: irregular, narrow oblique streaks *metoeca*
   Costal marks in fore wing few: large rounded or erect spots *triphaenella triphaenella*

Bathypluta triphaenella (Snellen)

Cerace triphaenella Snellen, 1903, *Tijdschr. Ent.* **46:** 26, pl. 4, fig. 1 (♀). Meyrick, 1912, in Wagner, *Lepid. Cat.* **10:** 15. 1913, in Wytsman, *Gen. Ins.* **149:** 20. Diakonoff, 1939, *Zoöl. Meded.* **21:** 131, fig. 1 c; 1941, *Treubia,* **18:** 377 (descr. ♂, food plants).

♂ 22 mm. Head blackish-violet, mixed with dark purple on vertex. Antenna whitish, ringed black, ciliations in ♂ white. Palpus blackish-violet. Abdomen blackish-violet, anal tuft light yellow. Legs blackish, median femur and top of tibia ochreous, posterior leg whitish-ochreous, femur blackish above. Fore wing with costa strongly abruptly arched at base, concave before middle, gradually slightly curved towards apex, apex broadly rounded, termen outwardly oblique above, considerably prominent between veins 7–4, vein 6 to this secondary apex, termen little curved, oblique beneath. Ground colour bright orange-yellow, scattered with whitish-silvery shining dots; a blackish-violet triangular blotch on base of wing from costa across ¾ of wing breadth, its posterior edge straight, little oblique, its lower angle sharply projecting; some blackish and purple scales on ⅙ of dorsum; a very narrow suffused dark purplish streak along costa, dilated posteriorly, interrupted about six times by silvery shining blotches above mentioned, the last of these on ½ of costa; apical part of wing from before ⅗ reddish-purple, suffused with blackish-brown along anterior edge, which is convex and shows 5 diffuse dentations; apical area scattered with ochreous-yellow scales and dots and with shining bluish-leaden blotches: 4–5 transverse crescent streaks on costa, smaller, round dots in disk; a yellow terminal suffusion on vein 6. Cilia brownish-black, mixed with yellow on vein 6. Hind wing bright yellow, apical fifth blackish with dentate anterior edge. Cilia blackish.

Tegumen (Fig. 21) moderate. Uncus broadly rounded above, densely bristled below. Gnathos moderate, with a strong broad point. Socii small, scarcely ⅓ of gnathos. Valva elongate, little dilated; cucullus obliquely truncate, its top somewhat projecting; harpe short; sacculus moderately broad but strong. Transtilla narrow, straight. Aedoeagus short, tubular, its orifice with somewhat indented edge. Cornuti not perceptible. (Gen. No. 601 D.)

♀ 37–39 mm. Head bright ochreous mixed with reddish-fuscous, tuft on vertex reddish-fuscous, collar ochreous. Antenna with basal joint ferruginous-black, shaft white, ringed with blackish. Palpus ferruginous-blackish; median segment edged below and on apex with fuscous-ochreous. Thorax bright ochreous, markings reddish-fuscous: an anterior and a median transverse band and a median longitudinal streak on mesothorax; metathorax and a brush of long hairs on each side dark brown. Abdomen golden-yellow, tergites with posterior half dark bronze-brown, each segment with a quadrate bronze-brown lateral patch; anal tuft golden-yellow. Legs bronze-brown, tibiae especially at extremities, and tarsi mixed with ochreous. Fore wing with upper parting vein weak in middle, to between veins 8 and 9, lower parting vein weak, terminal veins long, slightly sinuate. Rather narrow, elongate, broadest at ⅘; costa abruptly strongly arched at base, slightly concave in middle, rounded and somewhat projecting at ⅘, oblique posteriorly, apex broadly rounded, termen slightly outwardly oblique above, strongly prominent between veins 7–4, vein 6 to top of this prominence, termen oblique beneath. Reddish-fuscous, covered with irregular series of round dots of different size, which are more or less completely edged with leaden-metallic shining scales; a row of large somewhat oblique round spots along costa, below this the wing is rather irregularly covered with dots of very different sizes, except in disk beyond middle, where two short longitudinal streaks of ground colour remain undisturbed, somewhat darker reddish-ochreous. Cilia ochreous mixed with fuscous. Hind wing bright yellow, apical fifth black, its anterior edge almost straight, slightly suffused, faintly serrate, from ⅘ of costa to end of fold. Cilia black from apex to anal angle, whitish-yellow beyond this.

7th segment (Fig. 32) not sclerotized, emarginate ventrally. Ostium broad, cup-shaped, strong, abruptly narrowed beneath. Limen very narrow in middle, slightly dilated at the sides. Ductus bursae short. Bursa copulatrix very long, elongate-tubular, pear-shaped at the end. No signum. (Gen. No. 613 D.; No. 612 D. of a reared and not yet fertilized specimen with bursa strongly constricted and appearing short. No. 586 D. with a minute sclerotization at the beginning of the bursa copulatrix, which might be the remains of an atrophied signum; this specimen is Snellen's cotype in the Leiden Museum.)

WEST JAVA, Tjinjiroean, 4,700 ft., Sindanglaja, 3,600 ft. (*Dr. P. van der Goot, L. J. Toxopeus*). 2 ♂, 10 ♀. There are also one ♂ in the British Museum, and another in the author's collection. The above redescription of the ♀ is drawn after Snellen's type specimen, which is in the Leiden Museum, Netherlands.

Bathypluta triphaenella nox Diakonoff

Cerace triphaenella nox Diakonoff, 1941, *Treubia* **18:** 378 (♀, food plant).

♀ 32 mm. Head, palpus, thorax, and fore wing unicolorous dark brownish-black, regularly scattered with rounded and elongate shining bluish-leaden patches and dots. (These patches are congruent with light markings in the typical form.) Hind wing, abdomen and legs as in typical form.

WEST JAVA, Sindanglaja, x.1935, feeding on leaves of the tea-plant (*Dr. P. van der Goot*); Soekanegara, 1.vi.1936 (Dr. L. J. Toxopeus). 2 ♀. The genitalia are identical with those of *t. triphaenella*.

Bathypluta triphaenella melanoptera Diakonoff

Cerace triphaenella melanoptera Diakonoff, 1911, *Treubia*, **18:** 378 (♂, food plants).

♂ 22 mm. Head and palpus reddish-brown, mixed with ochreous; thorax and tegula dark brownish-purple and red, collar and edge of tegula ochreous. Abdomen dark yellow, each segment with a dark brown band, interrupted laterally. Fore wing somewhat broader than in ♂ of the type, blackish-brown; apical ⅖ reddish, suffused with brownish, especially in tornus, with suffused yellowish dots along costa and apex; wing is scattered throughout with leaden-metallic spots, less distinct than in the typical form; a reddish streak on ⅙ of dorsum. Hind wing dark greyish-brown with costa from base to ¾ orange-yellow, scattered with brown scales, especially on veins 3–6.

♀ 21 mm. Head, thorax, and abdomen reddish-black, anal tuft orange-yellow. Fore wing as in ♂ but darker, apical part dark brownish-red, metallic spots more distinct. Hind wing orange-yellow, paler at base, suffused with blackish on veins beyond cell, with marginal ⅓ blackish, sometimes entirely suffused with blackish.

WEST JAVA, Sindanglaja, 6.ix.1935, larva attacking leaves of the tea-plant; Tjinjiroean, 11.x.1935, larva attacking the leaves of the Cinchona-tree. (*Dr. P. van der Goot.*) 1 ♂, 2 ♀. The genitalia are identical with those of *t. triphaenella*.

Bathypluta triphaenella sparna subsp. nov.

σπαρνός = rare

♀ 40 mm. Head and thorax orange-ochreous, mixed with reddish-ferruginous, except face below, vertex posteriorly and posterior half of tegula. Palpus dark brown, mixed with ochreous above and beneath. Antenna blackish-brown, ringed with whitish above, whitish beneath. Abdomen golden yellow, lateral transverse elongate spots and dorsal posterior bands, which are broad and narrowed laterally dark brown. Legs ochreous-yellow beneath, golden-yellow, anterior orange tinged, tibiae and tarsal segments with dark brown basal bands. Fore wing rather narrowly elongate, little dilated, costa abruptly strongly arched along basal ⅖, slightly concave before middle, broadly curved and slightly prominent at ¾, apex obliquely rounded, termen very oblique and concave on vein 7, projecting between 6 and 5, gently rounded, very oblique beneath. Upper parting vein to between 8 and 9. Reddish-ferruginous, markings ochreous more or less edged with fine leaden-metallic shining scales. A row of rather irregular, rounded or erect-semiovate spots along costa; wing elsewhere covered with irregular rounded spots of very different size, groups of these more or less confluent, forming larger patches of ochreous colour especially in disk before and beyond middle; a subquadrate somewhat suffused blotch of ground colour in middle of disk reaching from upper edge of cell to vein 2, slightly obliquely erected along this towards tornus, interrupted by only a few ochreous rounded dots; cilia ochreous, with a dark brown median band; interrupted to form ochreous patches in cells. Hind wing with veins 6 and 7 connate; rather narrow, elongate subtrapezoid, apex obtusely prominent, termen distinctly concave on vein 5; bright-yellow, somewhat paler towards base, a brownish-black marginal band from costa before apex, along termen to anal angle, occupying about ¼ of wing at apex, somewhat narrowed below as far as vein 3, narrower still but with inner edge parallel from vein 3 to tornus; inner edge slightly indent on vein 3, somewhat suffused. Cilia dark grey, with a fine pale basal line, followed by a broad black antemedian line.

EAST JAVA, Mt. Tengger. Type, unique, in the British Museum (Nat. Hist.).

Distinctly differing from typical *triphaenella* by the shape of the hind wing and by its dark marginal band which reaches to the tornus. Gen. No. 605 D., probably a not fertilized specimen with bursa copulatrix constricted in the same way as mentioned for No. 586 D.

Bathypluta metoeca sp. nov.

μέτοικος = a stranger

♀ 44 mm. Head and palpus pale whitish-ochreous, vertex mixed with ferruginous scales, palpus slightly mixed with brownish. Antenna ferruginous-brown, faintly ringed with pale ochreous above. Thorax light ochreous, mixed with reddish-ferruginous, except edges of tegulae and point of mesothorax, which has a median reddish-ferruginous streak; metathorax dark brown, lateral pencils brownish-grey. Abdomen golden-yellow, each segment with a broad dark coffee-brown band, extended over whole segment in middle, narrowed laterally, lateral patches elongate, black, anal tuft yellow-ochreous; under side dark brown. Legs ochreous-yellow, more or less suffused with dark brown above, femora dark brown above, basal segment of posterior tarsus with dark brown ring. Fore wing rather narrowly elongate, costa abruptly strongly curved at base, slightly concave at $\frac{1}{3}$, broadly rounded prominent at $\frac{3}{4}$, oblique but little curved before apex, apex with a small excavation on vein 7, termen prominent on vein 6, oblique, little curved beneath. Upper parting vein to between 8 and 9. Reddish-ferruginous, markings rather pale ochreous more or less edged with dark leaden-metallic brightly shining scales. A row of short, oblique blotches along costa, becoming wider separate posteriorly, scarcely reaching $\frac{1}{3}$ towards upper edge of cell; elsewhere densely dotted and strewn with small round patches of different size, more or less arranged in horizontal rows; a series of larger dots below basal half of fold; markings more or less confluent on basal $\frac{1}{3}$ of disk above fold except towards costa and from end of cell to termen, accentuating a suffused rounded large patch of ground colour in middle of disk little marked with dots; dorsum at $\frac{1}{4}$ and before tornus also less disturbed by dotting. Cilia pale ochreous, basal half dark grey. Hind wing elongate subtrapezoid, with veins 3 and 4 separate. Golden-yellow, glossy; a dull brownish-black, band along apex and termen, its anterior edge concave, gradually curved, slightly irregularly indent on veins, from costa beyond $\frac{3}{4}$, to beyond end of vein 1c; cilia blackish.

7th segment (Fig. 31), not sclerotized, broadly emarginate ventrally. Limen narrow, curved at the sides and in middle. Ostium very broad, shallow-cup-shaped, abruptly narrowed below and turned to the left. Ductus bursae rather narrow, moderately long. Bursa copulatrix very long, tubular, coiled in middle. (Gen. No. 602 D.)

Lesser Sunda Islands, Pura Id. (Alor Group), 2,000–4,000 ft., x–xi.1891 (Doherty). Type, unique, in the British Museum (Nat. Hist.). Closely allied to *triphaenella*.

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THE
EARLY LITERATURE ON MALLOPHAGA
(PART I)

THERESA CLAY
AND
G. H. E. HOPKINS

BULLETIN OF
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xrefs

PART I. 1758–62

Pp. 221–272; *Pls.* 1–2; 63 *Text-figures*

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THE EARLY LITERATURE ON MALLOPHAGA

By THERESA CLAY *and* G. H. E. HOPKINS

(*With Plates 1–2*)

SYNOPSIS

In this and subsequent papers it is intended to review the species of Mallophaga described between 1758 and 1818. As there is frequently confusion over the interpretation of these old names, neotypes will be erected and figured, thus fixing the identity of the species and their type hosts. The first part deals with the twenty-six species described by Linné (1758 and 1761) and the descriptive phrases of E. L. Geoffroy (1762) which previously have been accepted as valid binomial names.

PART I, 1758–1762

INTRODUCTION

PERHAPS no group of insects has suffered so much at the hands of authors who were ignorant of, or careless about, the Rules of Nomenclature as have the Mallophaga.

Nitzsch is rightly considered the pioneer of our systematic knowledge of the group, because he was the first after Redi to make a special study of the insects parasitic on mammals and birds. Unfortunately Nitzsch paid no heed to the Rules of Nomenclature,[1] and in his paper published in 1818 (the only one published by himself in which he gives specific names) he considered it necessary to rename, with only one or two exceptions, all the species mentioned by him which had already been named by previous authors, quite regardless of whether the names formerly given them were valid or not.

Until fairly recently nearly all authors had accepted this state of affairs, though a few pre-Nitzschian names were restored at different times. But in Harrison's catalogue of the Mallophaga (1916) a real attempt to apply the principle of priority in the nomenclature of the Mallophaga was made, and the nomenclature and synonymy given by him have been very generally accepted since. Unfortunately Harrison accepted too readily the conclusions of earlier authors (especially Piaget) in questions of synonymy, regarded as valid a large number of names that have no validity under the international rules, and discarded other names for reasons that are inadequate under the same rules.

Opponents of the strict application of the principle of priority often argue that it is not scientific to use names attached to grossly inadequate descriptions, especially when the types are no longer in existence, in place of names given in connexion with good descriptions and of which the types are still preserved. This is a perfectly reasonable attitude, and it is one that supporters of the Rules of Nomenclature should do all they can to satisfy. A single example will at once show how valid the criticism is: three recent authors have utilized the name *Pediculus corvi* Linn. for three different species of *Philopterus*, though all of them recognize that the three species of *Philopterus* concerned are distinct. Such confusion, due to individual interpretations of what is meant by a Linnean or other early name, can only (so we think) be avoided by the establishment of neotypes for species of which the original types are lost, as is the case with nearly all the species described prior to Nitzsch. We therefore think the time is ripe for a re-examination of all names applied to Mallophaga up to and including 1818, the re-examination being based on the original descriptions and only to a very secondary degree on the opinions of later authors, followed by the definite fixation of these names by the establishment of neotypes.

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[1] Rules of Nomenclature were formulated in Linnean times, but post-Linnean authors, especially in the early part of the nineteenth century, were usually too busy naming organisms to respect the work of their predecessors.

A few notes are necessary as to the hosts of our neotypes. Most of the earlier authors give no indication of the source of their material, but a species described in *Fauna Suecica* must be assumed to have come from Sweden, a species described in *Fauna Boica* from Bavaria, in *Fauna Groenlandica* from Greenland, and in *Entomologia Carniolica* from Carniola, a district formerly in Austria and now in Yugoslavia. But it is necessary to remember that in the case of Mallophaga the locality is of very minor importance and the all-important point is the species (and sometimes the subspecies) of the host. Furthermore, birds are not stationary objects and a White Stork, for instance, which is in Sweden to-day may be in tropical Africa a few weeks hence. Naturally the parasites of a White Stork shot in Europe will not differ in any way from the parasites of the same bird shot on migration in Africa. Even the so-called non-migratory species have their own local movements which pay no heed to the political divisions of the world. Where there is some indication of the locality from which a species of Mallophaga was described we have felt ourselves bound to select neotypes from a subspecies of the host which occurs in the country concerned, though not necessarily from a bird actually obtained in that country nor from the resident subspecies of the host.[1] In the case of migratory birds and domestic birds and mammals we have felt ourselves to have a perfectly free hand in the matter of locality. A further difficulty, applying mainly in the case of Linnean names, is that in many instances Linné had not seen the insect concerned and his name derives its validity solely from a reference to one of Redi's figures. The host-names in the original version of Redi's work were in Italian, but Linné referred to a Latin version in which the host-names were sometimes mistranslated. In such cases we consider the host to be the species indicated in the original Italian version of Redi, not that suggested by the mistranslation into Latin and accepted by Linné. In other instances a species as originally described has more than one host, and we have adopted two principles in dealing with such instances: In the writings of Linné and some of the other early authors it commonly happens that after naming a species they give a secondary appellation such as '*P. Falconis Tinnunculi*', '*P. Sternae Hirundinis*', followed by '*Habitat in Falconibus Tinnunculis, Milvis*', '*Habitat in Sternis, Laris*'. We regard the secondary appellation as a definite indication of the type-host and have considered ourselves bound by it. Furthermore, it very commonly happens that the name given by Linné covers a species which he had himself seen and described and a different species which is represented by a reference to a plate published by some other author. In such cases it seems to us to be obvious that in restricting the name we must apply it to the material actually seen by its author.[1] We have quoted host-names both in the original form and under the modern equivalent, the modern form (only) with the author's name added.

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[1] Although even so early a writer as Redi, whose work was published in 1668, examined captive mammals in the Grand Duke's menageries and foreign birds in the Boboli Gardens.

Our purpose being only to fix the old names beyond possibility of doubt, we have made little attempt to decide which of them are synonyms, and have treated all names of forms from different hosts as referring to distinct species. The forms of *Philopterus* from many small Passerines, for example, seem to us to be at most subspecifically distinct, but will be treated here as full species.

In interpreting the old descriptions it must be borne in mind that the naturalists of the eighteenth and early nineteenth centuries must have worked with very imperfect forms of microscope, producing only low magnifications. We think that what some of them saw can probably be appreciated better by the use of a hand-lens than by employing a modern compound microscope.

Measurements of typical males and females have been given as an indication of the general size and proportions of the species. The length of the head was measured along the midline, total length from the middle of the anterior margin of the head to the most distal point of the abdomen; measurements of breadth were made at the widest point. An asterisk placed against the measurement of the length of the male genitalia means that this measurement was made from another specimen.

Publications in which the so-called names proposed are invalid (because, for instance, they are not names but descriptive phrases) are only discussed below in so far as they bear on the identity of species described under valid names, and we have not felt justified in wasting much time or space over names that were preoccupied when published and can never become valid, except when valid names have been given to the species at a later date. Similarly we have not felt it necessary to note the infinite repetitions that are to be found in so much of the early literature, except where the author has added something to our knowledge of the species.

We feel that our action (in a later instalment) in designating neotypes for such of Nitzsch's 1818 names as are not *nomina nuda*, when specimens purporting to be type-material of some of them are in existence, calls for an explanation. Our action is essential for the very reason that the Halle collection contains material purporting to be the types, for it cannot be too strongly emphasized that, since none of Nitzsch's 1818 names has any validity except that derived from the references he gives to previous descriptions, the types are not the specimens in his collection but the lost types of the earlier authors. In many cases Nitzsch's names are absolute synonyms, and in such cases our designation of a neotype for the old name is of necessity a designation of a neotype for Nitzsch's name also (e.g. the neotype of *Pediculus dolichocephalus* Scopoli is automatically the neotype of *Liotheum* (*Physostomum*) *sulphureum* Nitzsch). But in the cases of the few valid names a most serious difficulty might arise, of which examples may be useful: *Philopterus* (*Docophorus*) *icterodes* Nitzsch 1818 is a perfectly valid *nomen novum* for the species shown in De Geer's pl. 4, fig. 14 (1778), and the host must of necessity be *Mergus serrator*, but (judging from the list of hosts given by Giebel in 1874) Nitzsch had no material from this host. Similarly, *Liotheum* (*Trinoton*) *conspurcatum* Nitzsch 1818 is a new name for *Pediculus anseris* Sulzer 1776 *nec* Linné 1758, but Nitzsch gives as hosts both *Anser cinereus* and *Cygnus olor*; the species on these two hosts are almost certainly not the same, and if the *Cygnus* were to be selected as type-host of *conspurcatum* the name would be applied to the wrong species. Such selection would be quite invalid, but more confusion would result before it was corrected. We have to remember that the Halle collection has been (and may again be) in the hands of authors who do not entirely accept the Rules of Nomenclature and who might well make invalid type-selections. To avoid any possibility of such action we have designated neotypes for all the potentially valid names contained in Nitzsch's work of 1818, which will be the last work considered in the present series of papers.[1]

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[1] As far as Linné is concerned this usually presents no difficulty: he marks with a † species which he had not seen, and in cases where he had seen material from one of the hosts he mentions, but not from the others, it is usually possible to ascertain from which host his material came by reference to *Fauna Suecica*.

It is our pleasant duty to thank Dr. Karl Jordan, F.R.S., President of the International Commission on Zoological Nomenclature, for much invaluable assistance in the interpretation of the Rules. We are also indebted to the Trustees of the British Museum for permission to publish Figs. 1, 7, 12, 13, 15, 19, 35, 43, 49, drawn by Mr. A. J. E. Terzi, and to Colonel Richard Meinertzhagen for permission to publish Figs. 34–36, 38–40, 45, 48, 50, 52, 54–59 by Mr. R. S. Pitcher, and Figs. 60–62 by Mr. A. Smith. We are also indebted to Captain W. H. Pollen for the photographs on Plate 1, fig. 2, and Plate 2, figs. 1–2; the other photographs were taken by the late Mr. J. G. Bradbury.

LINNÉ, 1758 (*Systema Naturae*, Ed. x, **1**: 611–614)

Pediculus porcelli (p. 611)

By Article 21 of the International Rules of Nomenclature 'the author of a scientific name is that person who first published the name *in connection with an indication, a definition, or a description*' (italics ours). In the present instance none of these is to be found and *Pediculus porcelli* Linn. 1758 is a *nomen nudum* and has no standing in nomenclature. The first author to describe a species under this name was Schrank in 1781, and it will be discussed under his work.

Pediculus cameli (p. 611)

Although this name belongs to a sucking-louse, and has never been used otherwise, we must mention it because of the erroneous reference '*Red. exp. t. 22*' given by Linné. The species shown on Redi's plate 22 (1668) are both dealt with elsewhere by Linné and the reference should be to Redi's plate 20.[2]

---

[1] This was written before we knew of the destruction of the greater part of the Halle collection. We have let it stand because of the importance of the principle involved, but have now made many more neotypes than we previously intended.

[2] The numbering of the plates is the same in the Italian edition of Redi and in the Latin translation that Linné used.

Pediculus cervi (p. 611)

There is no description, but there are references to '*Frisch. ins.* 12. *p.* 15. *t.* 5' and '*Red. exp. t.* 5.' Frisch's plate represents a Hippoboscid. The reference to Redi is an obvious *lapsus calami*, for his plate 5 is a bird-parasite which is named by Linné on a later page. Redi's plate 23, however, represents two *Pidocchi del Cervo*, of which one is a sucking-louse and the other a Trichodectid, and there can be no doubt that it was to this plate that Linné intended to refer. *P. cervi*, as originally published by Linné, is a composite of a Hippoboscid, a Mallophagan, and an Anopluran.

Harrison (1916: 12 & 69) endeavoured to apply the name to the Trichodectid, quoting it as an earlier name for *Trichodectes longicornis* Nitzsch. But Linné (1761: 476) gives only the reference to Frisch, thus restricting the name to the Hippoboscid now known as *Lipoptena cervi* (Linn.). Much later, von Olfers (1816: 86) restricted the name *cervi* to the upper figure in Redi's plate 23, i.e. to the sucking-louse, so that Harrison's application of the name is twice invalidated.

Nitzsch's action (1818: 296) in applying the name *Trichodectes longicornis* to the lower figure on Redi's plate 23 is perfectly legitimate and his name must stand.

Pediculus ovis (p. 611)

The only apparent 'indication' is a reference to '*Red. exp. t.* 22 *f.* 1?', but this indication is qualified by a question-mark, which renders it nugatory. In passing it seems worth while pointing out that, as Redi's figure is fairly good, the presence of the query suggests strongly that what Linné had before him was something different. The author of *Pediculus ovis* is Schrank (1781, *q.v.*).

Pediculus bovis (p. 611)

There is an exceedingly brief description: 'P. Bovis Tauri, *abdomine lineis transversis octo ferrugineis*', and a reference to No. 1155 in *Fauna Suecica* (1746). Even this brief description is sufficient to indicate beyond reasonable doubt that Linné was describing the species later known as *Trichodectes scalaris* Nitzsch, and the description in *Fauna Suecica* is a quite detailed one of the same species.

Linné later changed the name of the species to *Pediculus tauri* (1761: 476, No. 1946), but otherwise it remained without synonyms until Nitzsch (1818: 296) renamed it *Trichodectes scalaris*; the latter name has no 'indication' except a reference to *P. bovis*. Kéler (1938: 450) described and figured a female from Nitzsch's series and (in the legend of fig. 34) called it '*Bovicola scalaris* Nitzsch (*bovis* Linné), typisches Weibchen'. This is not a designation of a type, and there is no such designation in the text of Kéler's work. The male appears to be excessively rare and was almost certainly unknown to Linné, but Bedford (1920, pl. 6, fig. 3) figured the genitalia of a single male contained in his collection and the same specimen served for Werneck's figures of this sex (Werneck, 1941: 196, fig. 1).

Neotype of *Damalinia bovis* (Linn.): a female, in the British Museum (Nat. Hist.) (slide No. 422), from domestic ox, *Bos taurus* Linn., Cyprus; this specimen was determined by F. L. Werneck and agrees with his excellent figures (1936, figs. 183–185). *Neallotype* Bedford's male specimen mentioned above, collected from *Bos taurus* Linn.

in South Africa, and still in the Bedford collection. *Neoparatypes*: 6 males and 97 females from the same host from Great Britain, Eire, Cyprus, South Africa, U.S.A., and Brazil; these include two specimens, labelled *Trichodectes scalaris*, in the Denny collection.

Since *T. scalaris* Nitzsch 1818 owes its validity entirely to the reference to *bovis*, our neotypes of the latter are automatically also neotypes of *Damalinia scalaris* (Nitzsch).

Pediculus equi (p. 612)

A *nomen nudum*, which was copied into the works of almost all authors, still as a *nomen nudum*, until Denny (1842: 61, 191, pl. 17, fig. 7) finally described a *Trichodectes equi* which he attributed to Linné. The confusion into which Harrison and Johnston (1912: 20, 21) and Harrison (1916: 70, 72) fell over these names necessitates our saying more about them than would otherwise have been required. In the former paper the authors state that *equi* Denny and *equi* Linn. are not the same, that *T. pilosus* Giebel and *T. parumpilosus* Piaget are Denny's species, and that *T. pilosus* Piaget *nec* Giebel is the species 'described' by Linné. The actual facts are that as Linné never described his species it is impossible to say what it may have been, that *T. pilosus* Piaget *nec* Giebel is a goat-parasite, and that *pilosus* Giebel and *parumpilosus* Piaget are synonyms of *Damalinia equi* (Denny).

Pediculus asini (p. 612)

Like *cameli*, this name belongs to the Anoplura and has never been applied to a Mallophagan. It is only mentioned because Linné gives the erroneous reference '*Red. exp. t.* 22. *f.* 1'. Redi's '*Pidocchio dell Asino*' is depicted on his plate 21.

Pediculus tinnunculi (p. 612)

There is no description, but there are references to *Fauna Suecica* No. 1157 (1746), '*Red. exp. t.* 13' (1668), and '*Frisch. ins.* 11. *p.* 24. *t.* 24'; the host-record is '*habitat in Falconibus Tinnunculis, Milvis*'. The description in *Fauna Suecica* is fairly detailed and could not apply to any parasite of the Falconidae but a *Laemobothrion*, as is confirmed by the plates of Redi and Frisch, both of which represent species of this genus, though Frisch's species is not the same as Redi's. The only host-record in *Fauna Suecica* is '*Habitat in Falcone Tinnunculo s. Cenchride* 67'.

The species was renamed *Nirmus hasticeps* by von Olfers, and this name was altered to *hastipes* by Burmeister (1838: 442); otherwise there appear to be no synonyms except that Kéler (1937: 322) quite wrongly applied the name *Laemobothrion giganteum* Nitzsch to the present species; *giganteum* is a different species and will be dealt with in the discussion of Nitzsch's paper of 1818.

This species is a typical *Laemobothrion* with characters as shown in Pl. I, fig. 1, and Figs. 1–5. It lacks the longitudinal line of hairs on the lateral margins of the sternal plates seen in related species, and has fewer hairs on the anterior margin of the prothorax (4–6 each side).

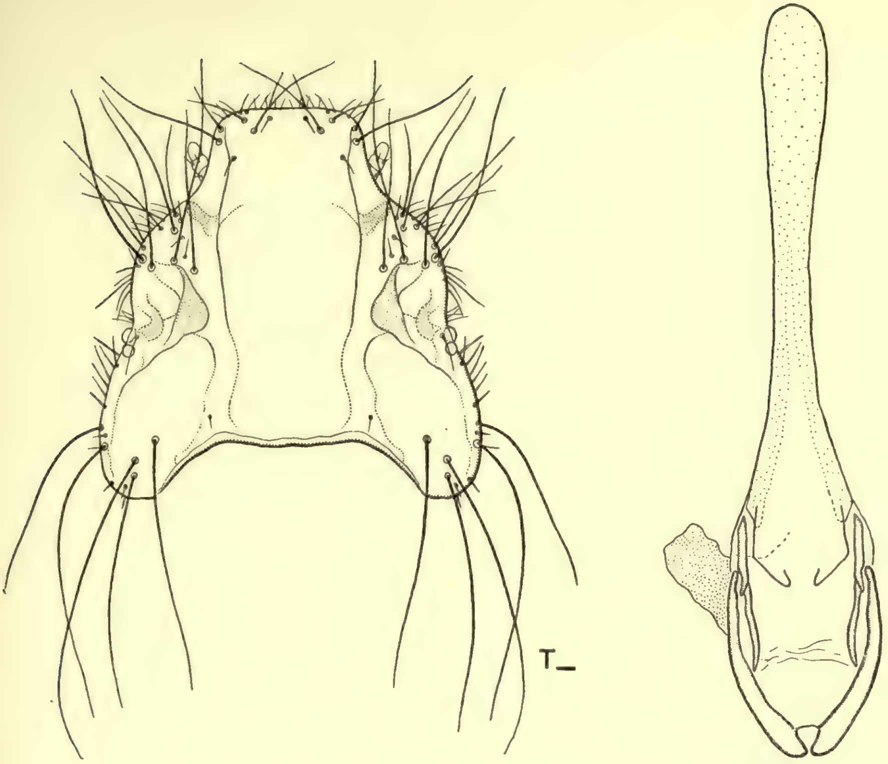


FIG. 1 FIG. 2

FIGS. 1–2. *Laemobothrion tinnunculi* (Linn.), ♂: 1. Head, dorsal. 2. Genitalia.

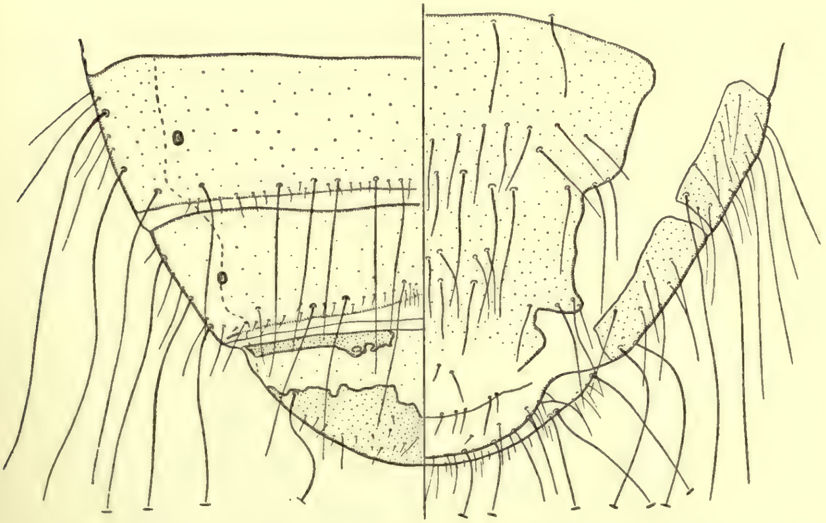


FIG. 3. *Laemobothrion tinnunculi* (Linn.), ♂, terminal segments of abdomen.

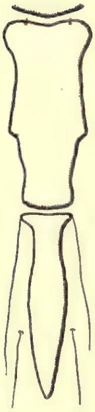


FIG. 4

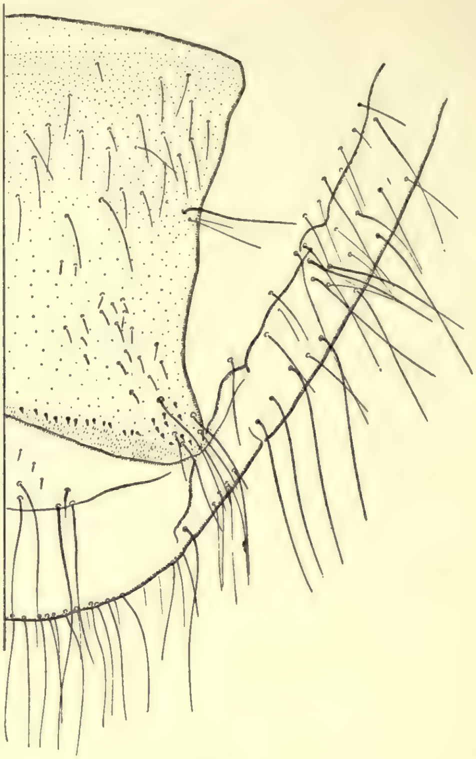


FIG. 5

FIGS. 4–5. *Laemobothrion tinnunculi* (Linn.), ♀: 4. Sternal plates of thorax. × 37. 5. Terminal segments of abdomen, ventral.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	1·25	1·37	1·40	1·66
Abdomen . .	4·25	2·22	5·45	2·60
Total . . .	7·70	..	8·35	..
Genitalia . .	2·02*	..	..	..

Neotype of *Laemobothrion tinnunculi* (Linn.): A female in the British Museum (Nat. Hist.) (slide No. 405), from *Falco t. tinnunculus* Linn., from Cyprus. *Neallotype*: a male in the British Museum (Nat. Hist.) (slide No. 406) from the same host-form from Uganda. *Neoparatypes*: 9 males and 25 females from the same host-form, Great Britain, Cyprus, Palestine, Asia Minor, India, and East Africa.

Neotype of *Laemobothrion hastipes* Burmeister: a female (Meinertzhagen collection, slide No. 6079) from *Falco t. tinnunculus* Linn. from Kenya, which agrees with the neotype of *L. tinnunculi* (Linn.). *Laemobothrion hasticeps* (von Olfers) will be dealt with under the work of the latter author.

Pediculus corvi (p. 612)

The species is not described, but there are references to No. 1158 in *Fauna Suecica* (1746) and to '*Red. exp. t.* 16. *f.* 2' (1668). The host-record is '*habitat in* Corvis'.

There has never been any doubt that the description in *Fauna Suecica* refers to a *Philopterus*, and this view is confirmed by Redi's figure. But the question of the specific identity of *Philopterus corvi* (Linn.) is much more debatable and has given rise to much confusion. Harrison (1916: 92) incorrectly quotes the host as *Corvus corone* and places *atratus* 'Nitzsch in Denny' as a synonym; Thompson (1935: 214) accepts the erroneous host-record given by Harrison and places *ocellatus* (Scopoli) as a synonym, and Kéler (1937: 323, 324), noting correctly that Redi's '*Pollino del Corvo*' (Redi's plate 16, left-hand or lower figure) represents the species found on the Rook, uses '*Docophorus corvi* (Redi) Linné' to replace *Philopterus atratus* Nitzsch.

It is generally recognized that the species found on *Corvus corax*, *Corvus corone* (sspp. *corone* and *cornix*), and *Corvus frugilegus* are different; they have usually been referred to as *Philopterus* (or *Docophorus*) *semisignatus*, *ocellatus*, and *atratus* respectively, all the names being attributed to Nitzsch. Of these, the second was first used by Scopoli in 1763 and will be dealt with below; *atratus* (Nitzsch, 1818: 290) is a *nom. nov.* for the species depicted by Redi on his plate 16 and is the valid name for the species found on *Corvus frugilegus* unless it is a synonym of an earlier name, which we hope to show that it is not.

In our opinion none of the determinations of *Pediculus corvi* Linn. that we have quoted above can be sustained. Linné not only gives a reference to *Fauna Suecica*, where the only host is *Corvus corax*, but gives '*P. Corvi Coracis*' as his secondary appellation for the species. The type-host is, therefore, *Corvus corax*, and *Docophorus semisignatus* Denny (1842: 41, 66, pl. 1, fig. 5) must sink as a synonym.

This species (Pl. I, fig. 2; Figs. 6–9) is distinguished from related species by having the clypeal signature sclerotized only at the anterior end.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·70	0·66	0·72	0·75
Abdomen . .	1·00	0·85	1·06	0·97
Total . . .	1·95	..	2·03	..
Genitalia . .	0·38	..	..	..

Neotype male and *neallotype* female of *Philopterus corvi* (Linn.): a male and female in the Meinertzhagen collection (slide No. 16149) from *Corvus corax corax* Linn., from Sweden. *Neoparatypes*: 41 males and 45 females from the same host-form, Sweden, Russia, and Great Britain.

Lectotype of *Philopterus semisignatus* (Denny) here selected: a male in the Denny collection (slide No. 201) from *Corvus c. corax* Linn. from Britain. *Paratypes*: 1 male and 8 females with the same data.

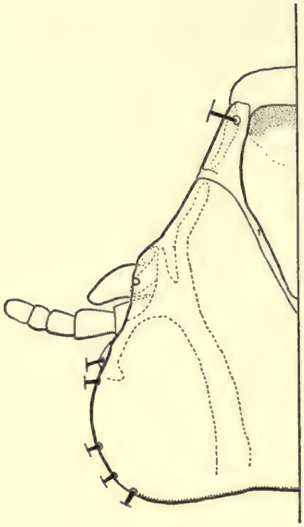


Fig. 6

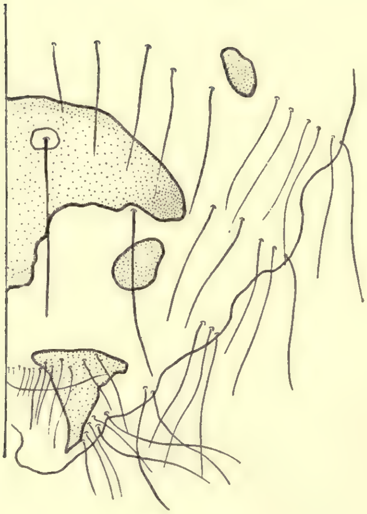


Fig. 8

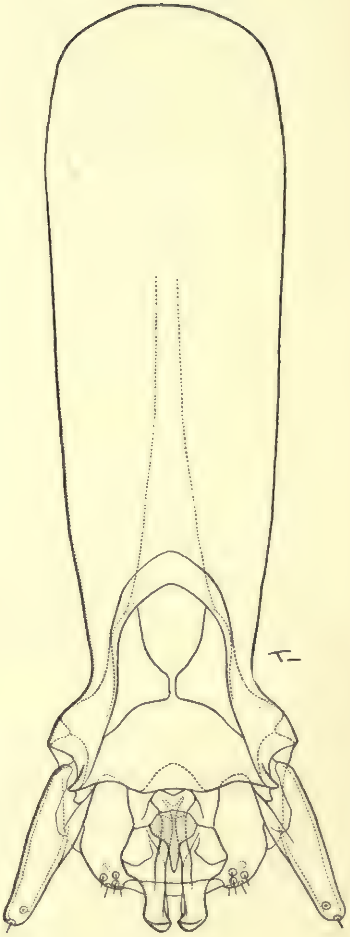


Fig. 7

Figs. 6–8. *Philopterus corvi* (Linn.): 6. ♂ head, dorsal. 7. ♂ genitalia. 8. Terminal segments of ♀ abdomen, ventral.

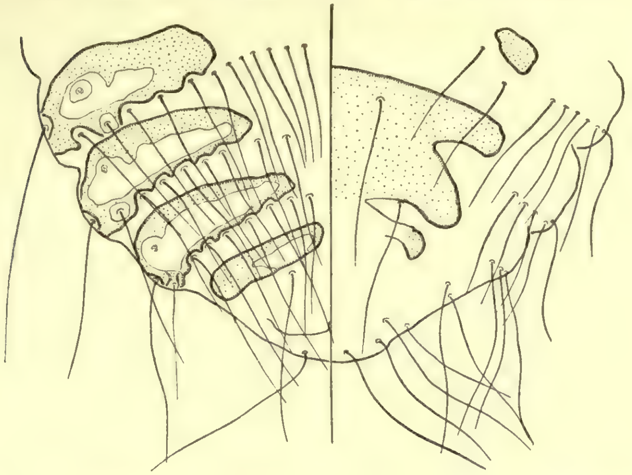


FIG. 9. *Philopterus corvi* (Linn.), terminal segments of male abdomen.

Pediculus infausti (p. 612)

As this species was described from material supposedly collected from a bird and was quoted in the literature dealing with Mallophaga for very many years it must have a brief notice. Harrison (1916: 15) writes of it: 'Based on a brief description in the *Fn. Suec.* of what is very clearly a Psocid.' We entirely agree with this opinion.

Pediculus picae (p. 612)

A *nomen novum* for the species depicted by Redi on plate 5, and marked by Linné as not seen by him. This name has given us a great deal of trouble owing to confusion over the host. In 1668 Redi calls the parasite '*Pollino della Garza*', but in the Latin editions of Redi (1671 and 1729) the louse is called *Pulex picae*. Now '*garza*' is *Egretta a. alba*, whereas '*gazza*' is the magpie, *Pica. p. pica*, and Linné gives the host of the species as *Corvus Pica*. Harrison (1916: 17) states that '*gazza*' means jay, but this is incorrect. The further statement made by Harrison (l.c.) that 'Linné's species is undoubtedly that mentioned in the *Fauna Suecica* as coming from *Pica lapponica*' is also incorrect: not only does Linné mark *picae* as not seen by him (whereas he had seen the species on *P. lapponica*), but comparison of his references shows that the species from *P. lapponica* is *Pediculus infausti*, with which we have just dealt.

We have either to assume that the host given in 1668 was a *lapsus calami* for '*gazza*' or that the host given in the Latin editions is a mistranslation; either assumption could be supported by parallel cases. We have searched many herons, including *Egretta alba*, without finding any Mallophaga remotely resembling Redi's figure, nor have any authors known to us figured any species at all like it from the Ardeidae. Séguy (1944: 134, fig. 192) has taken up a suggestion made by Denny (1842: 214) and uses the name for the common *Myrsidea* of the magpie. This species sufficiently resembles Redi's figure (which is one of his poorest) for us to feel bound to accept the identification. The species described by Denny (1842: 199, 213, pl. 18, fig. 6) as *Colpocephalum eurysternum* (*nec* Burmeister) is conspecific with *Myrsidea picae*

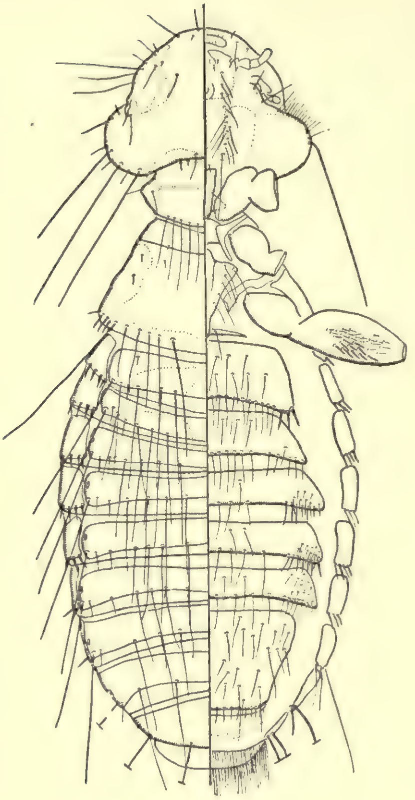


FIG. 10

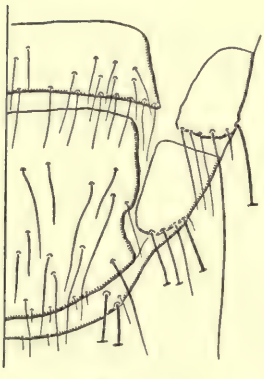


FIG. 11

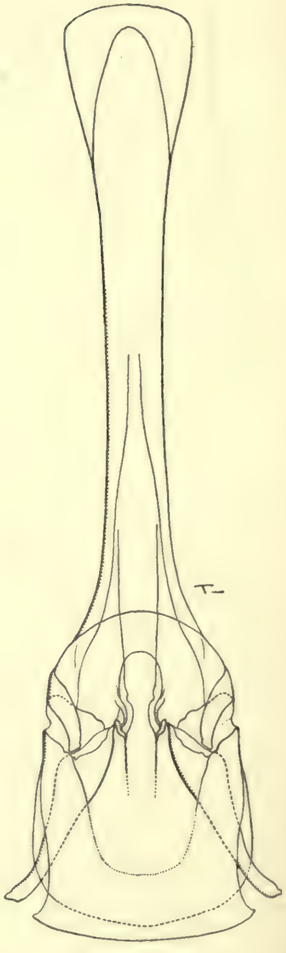


FIG. 12

FIGS. 10–12. *Myrsidea picae* (Linn.): 10. Female. 11. Terminal segments of ♂ abdomen. 12. ♂ genitalia.

(Linné), and is represented in the Denny collection by two females, but the species described by Piaget (1880: 433, pl. 34, fig. 2) as '*Menopon picae* D.' (though Denny never described any species under this name) has nothing to do with Linné's species, being a *Menacanthus*.

Myrsidea picae (Linn.) (Figs. 10–12) is distinguished from related species by the ventral chaetotaxy of the abdomen and the form of the tergal plates. The male resembles the female (Fig. 10) in general form but tends to be smaller, does not have the anterior tergal plates modified, and differs in the ventral chaetotaxy of the posterior segments of the abdomen (Fig. 11).

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·35	0·53	0·38	0·60
Abdomen . . .	1·03	0·65	1·28	0·87
Total . . .	1·82	. .	2·10	. .
Genitalia . .	0·57*	. .	. .	. .

Neotype female and *neallotype* male of *Myrsidea picae* (Linn.) in the British Museum (Nat. Hist.) (slide No. 408) from *Pica p. pica* (Linn.) from Liguria, Italy. *Neoparatypes*: 46 males and 83 females from the same host-form, from England, Estonia, Poland, Yugoslavia, and Macedonia.

Pediculus cygni (p. 612)

Linné had not seen this species and merely gives a reference to Redi's plate 8, which is an unmistakable representation of an *Ornithobius*. Redi gives the host as '*Cygno*' and Linné as *Anas cygnus*, but we have to take into consideration *Cygnus olor* (Gmelin), because this species was not recognized as distinct from *cygnus* in 1668 or 1758. We have examined material from both these hosts and find that the species of *Ornithobius* found on them are not the same; fortunately Redi's figure of the end of the abdomen is rather good and it definitely agrees better with the species found on *C. cygnus* (Linn.) than with that on *C. olor*. Redi's figure shows a female.

This species has comparatively little synonymy. No author added anything to our knowledge of it until Denny (1842: 60, 183, pl. 23, fig. 1) described and figured it as *Ornithobius cygni*, correctly attributing the name to Linné. Vollenhoven (1860, pl. 8, fig. 4) 'emended' the name to *cygnorum* and Rudow (1870: 139) described nymphs from *Cygnus musicus* (= *C. cygnus*) as *Metopeuron punctatum*. Denny's material, which is not in his collection in the British Museum, was from '*Cygnus ferus*, *olor*, and *bewickii*'; as the first of these names is a synonym of *C. cygnus* (Linn.), his material must have been a mixture including Linné's species. The species on *C. olor* (Gmelin) is *Ornithobius bucephalus* (Giebel).

Ornithobius cygni (Linn.) (Figs. 13–17) is distinguished from *O. bucephalus* (Giebel) by the absence of stout spines on the vulva and by the male genitalia.

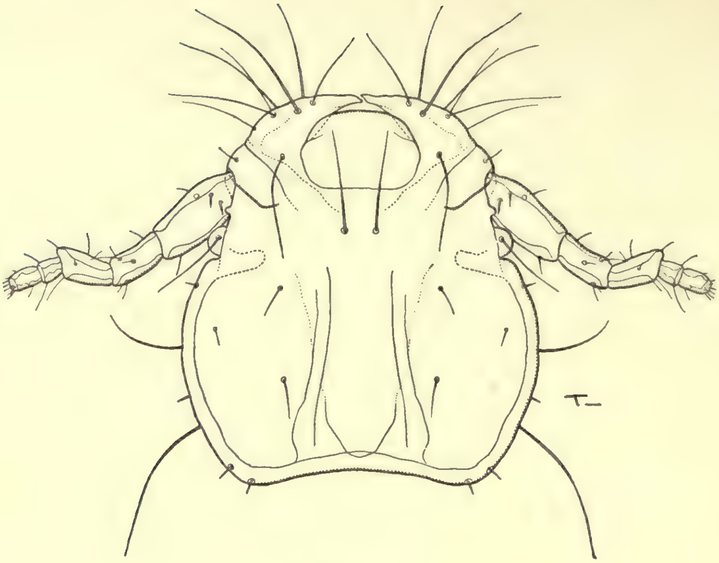


FIG. 13

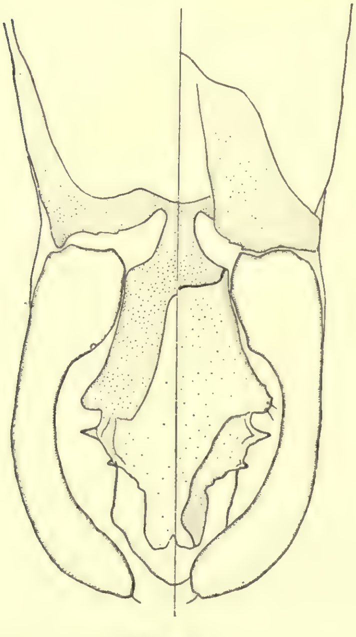


FIG. 14

FIGS. 13–14. *Ornithobius cygni* (Linn.), ♂: 13. Head. 14. Genitalia.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·88	0·85	0·82	0·80
Abdomen . .	2·70	0·98	2·52	1·16
Total . . .	4·35	..	4·05	..
Genitalia . .	0·66*	..	..	..

Neotype female and *neallotype* male of *Ornithobius cygni* (Linn.) in the Meinertzhagen collection (slide No. 119) from *Cygnus c. cygnus* (Linn.), South Uist, Outer Hebrides, Scotland. *Neoparatypes*: 4 males and 11 females from the same host-form from Scotland and Eire.

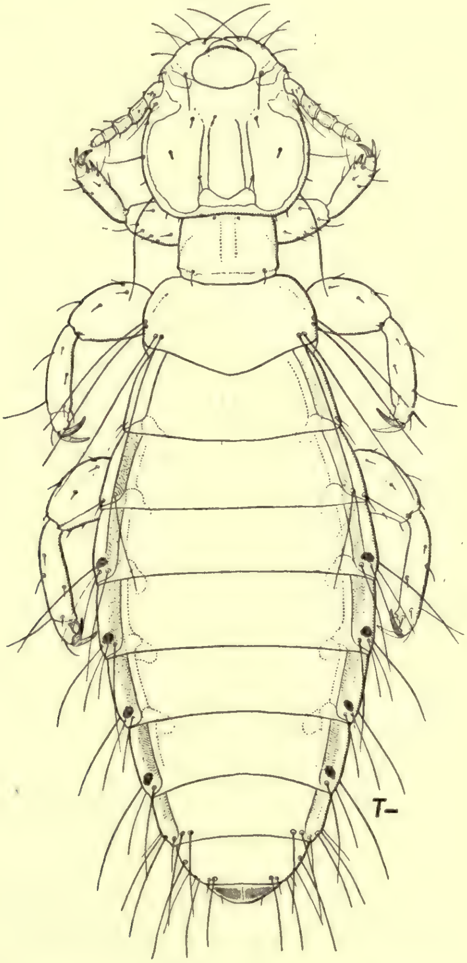


FIG. 15. *Ornithobius cygni* (Linn.), ♀.

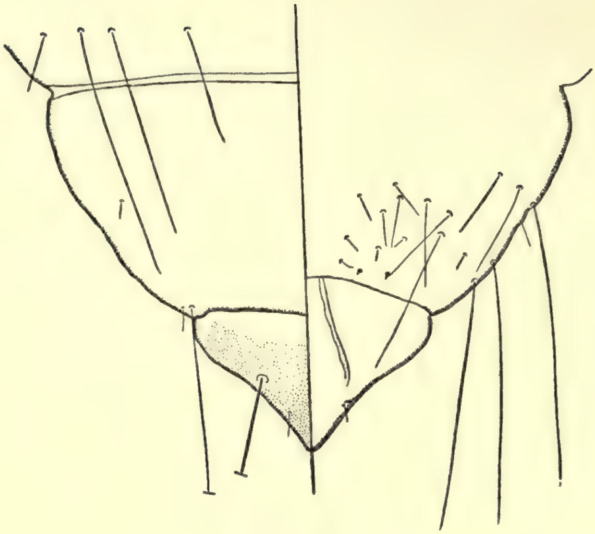


FIG. 16

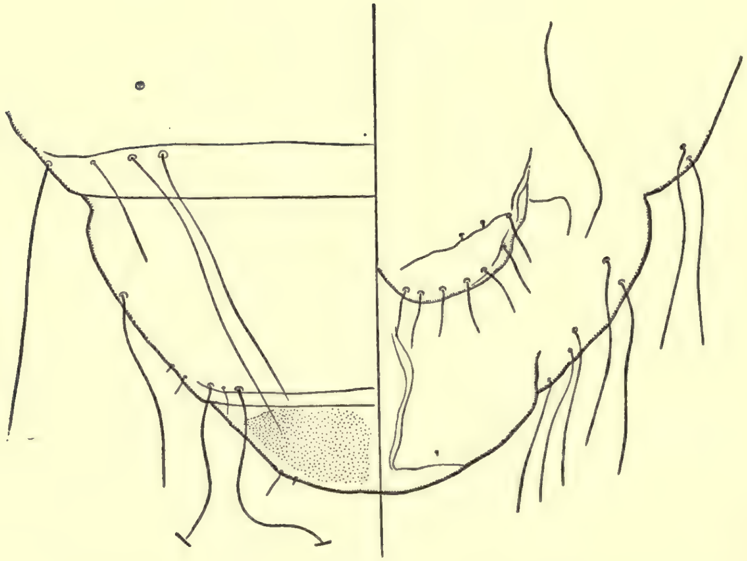


FIG. 17

FIGS. 16–17. *Ornithobius cygni* (Linn.), terminal segments of abdomen: 16. ♂. 17. ♀.

Neotype of *Ornithobius punctatus* (Rudow): a male (Meinertzhagen collection, slide No. 80) from *Cygnus c. cygnus* (Linn.) from South Uist, Outer Hebrides, Scotland, which agrees with the neotype of *O. cygni* (Linn.).

Pediculus anseris (p. 612)

There is no description, but a reference to Redi's plate 10. The host-record is '*habitat in Anseribus—feris & mansuetis*'.

Redi's plate 10 shows two '*Pollini dell' Oca Reale*' belonging to different genera; we must therefore seek a restriction of Linné's name. This is to be found in the work of J. C. Fabricius (1775: 807), where he adds to the references a brief description '*filiformis, pallidus: margine nigro punctato*'. This agrees with the species shown in the right-hand figure of Redi's plate and not with the other; this figure depicts an *Anaticola*, which must be known as *Anaticola anseris* (Linné), 1758. Fortunately this restriction agrees with the modern use of the name. The species which Sulzer (1776, pl. 29, fig. 4) depicted as *Pediculus anseris* is not congeneric and will be discussed as *Trinoton conspurcatum* Nitzsch, 1818. As regards Redi's host-name, '*Oca Reale*' appears to have no meaning, but '*Oca ferale*' would mean wild goose; there are on the plate very evident signs of an attempt to alter the word *Reale* and it seems probable that it was an error. In the Latin edition the parasite is called '*Pulex anseris sylvestris*', which tends to confirm this suggestion. We have assumed the wild goose to be *Anser anser* (Linn.).

Pediculus anseris Linné, as restricted by Fabricius, escaped synonyms (apart from the fact that von Olfers confused it with *crassicornis* Scopoli) until 1818, when Nitzsch proposed the name *Ph.* (*Lipeurus*) *jejunus* for it; he did not describe it, but cited references to Linné, Fabricius, and the right-hand figure of Redi's plate.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·61	0·42	0·68	0·48
Abdomen . .	1·59	0·51	2·06	0·73
Total . . .	2·76	..	3·50	..

Neotype male and *neallotype* female (Figs. 18–21; Pl. II, fig. 1) of *Anaticola anseris* (Linn.) in the Meinertzhagen collection (slide No. 228) from *Anser anser* (Linn.) from South Uist, Outer Hebrides, Scotland. *Neoparatypes*: 6 males and 12 females with the same data and from Ireland.

The neotypes are also automatically neotypes of *Anaticola jejunus* (Nitzsch).

Pediculus moschatae (p. 612)

Without description and with the symbol used by Linné for species he had not seen, but with a reference to '*Red. exper. t.* 9. *f.* 1'.

The central figure of Redi's plate, though unnumbered, is obviously the one to

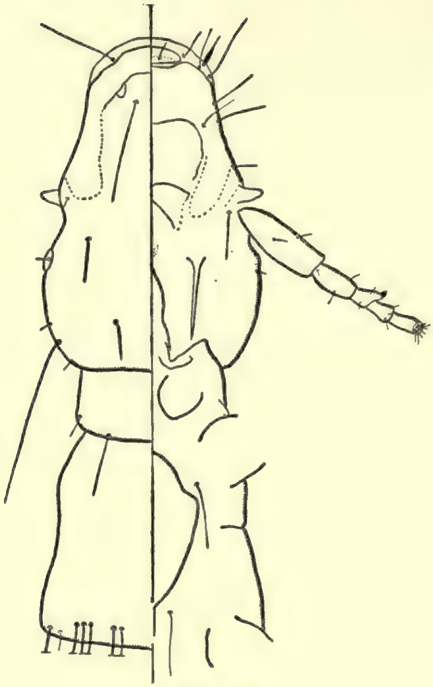
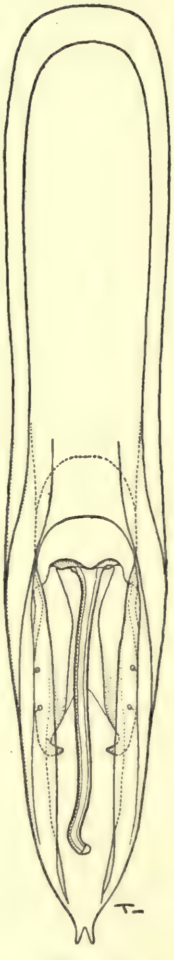


FIG. 18



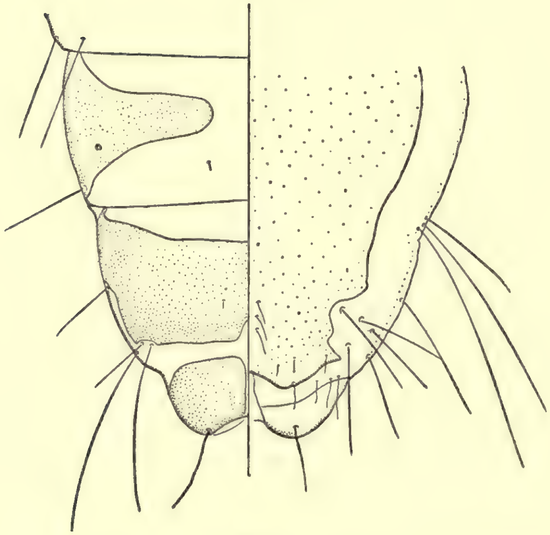


FIG. 20

FIG. 19

FIGS. 18–20. *Anaticola anseris* (Linn.), ♂: 18. Head and thorax. 19. Genitalia. × 173.
20. Terminal segments of abdomen.

which Linné refers; it is labelled '*Pollino del German Turco*' and is an unmistakable representation of a species of *Acidoproctus*. Linné gives the host as *Anas moschata*, which is definitely erroneous because the name '*German Turco*' belongs to *Netta rufina*. No *Acidoproctus* has been recorded from *Cairina moschata*, but the species on *Netta rufina* is well known as *A. stenopyx* (Burmeister) or *A. stenopygus* '(Nitzsch)'. Comparison of Redi's figure with those published by Giebel (1874, pl. 8, figs. 6 & 7) will show the high degree of accuracy to which Redi's artist sometimes attained.

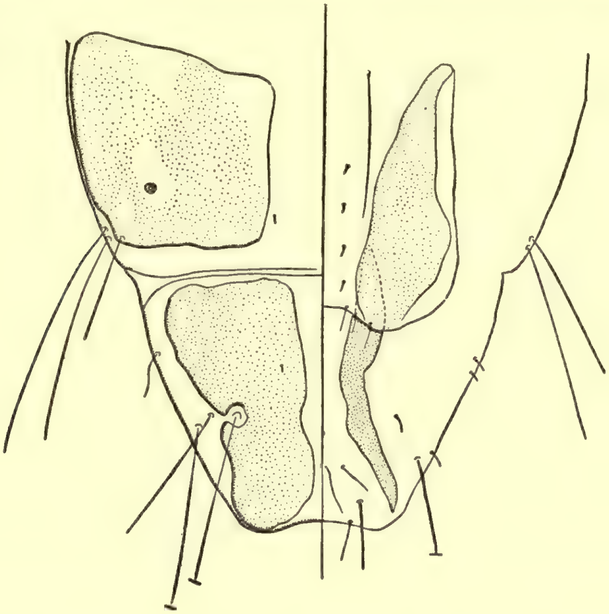


FIG. 21. *Anaticola anseris* (Linn.), terminal segments of ♀ abdomen.

This species (Figs. 22–25; Pl. I, figs. 3–4) is distinguished from related species of *Acidoproctus* by the shape of the head and terminal segments of the abdomen and by the characters of the vulva and male genitalia.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·83	0·68	0·85	0·70
Abdomen . .	2·38	0·88	2·58	0·95
Total . . .	3·88	..	4·05	..
Genitalia . .	0·58*	..	..	..

Neotype female and *neallotype* male of *Acidoproctus moschatae* (Linn.) in the Meinertzhagen collection (slide No. 10994), from *Netta rufina* (Pallas) from Rajputana,

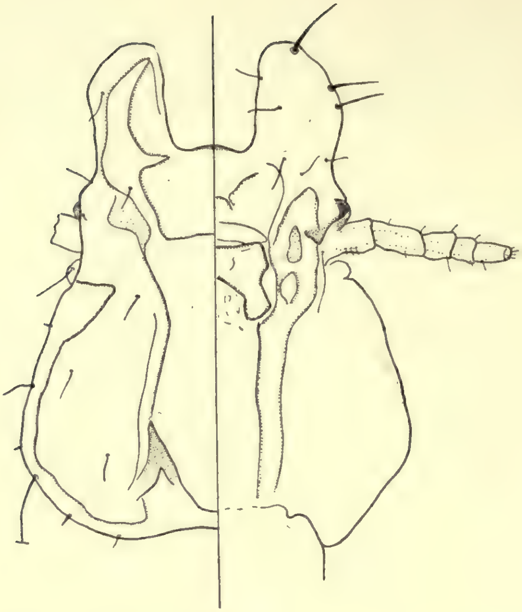


FIG. 22

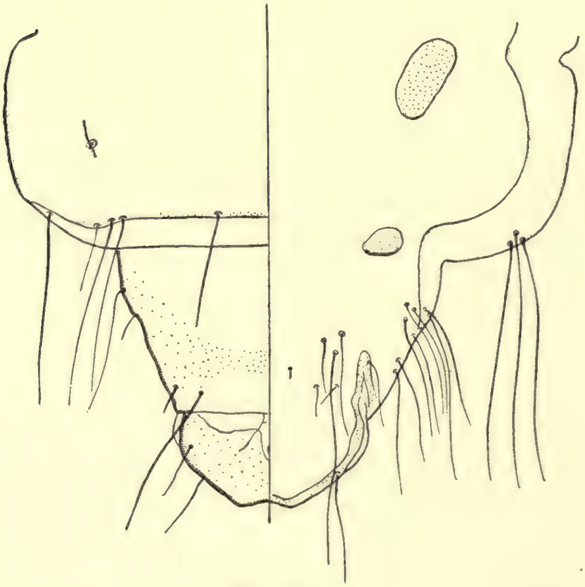


FIG. 23

FIGS. 22–23. *Acidoproctus moschatae* (Linn.), ♂: 22. Head. 23. Terminal segments of abdomen.

India. *Neoparatypes*: 27 males and 27 females from the same host-species, India, Lake of Antioch, and Russia.

Neotype of *Acidoproctus stenopyx* (Burmeister): a male (Meinertzhagen collection, slide No. 8938) from *Netta rufina* (Pallas) from Rajputana, India, which agrees with the neotype of *A. moschatae* (Linn.). Since *Lipeurus stenopygos* Giebel (1861: 318) is a *nomen novum* for *Nirmus stenopyx* Burmeister, the neotype of *Acidoproctus stenopyx* (Burm.) is also automatically the neotype of *A. stenopygos* (Giebel).

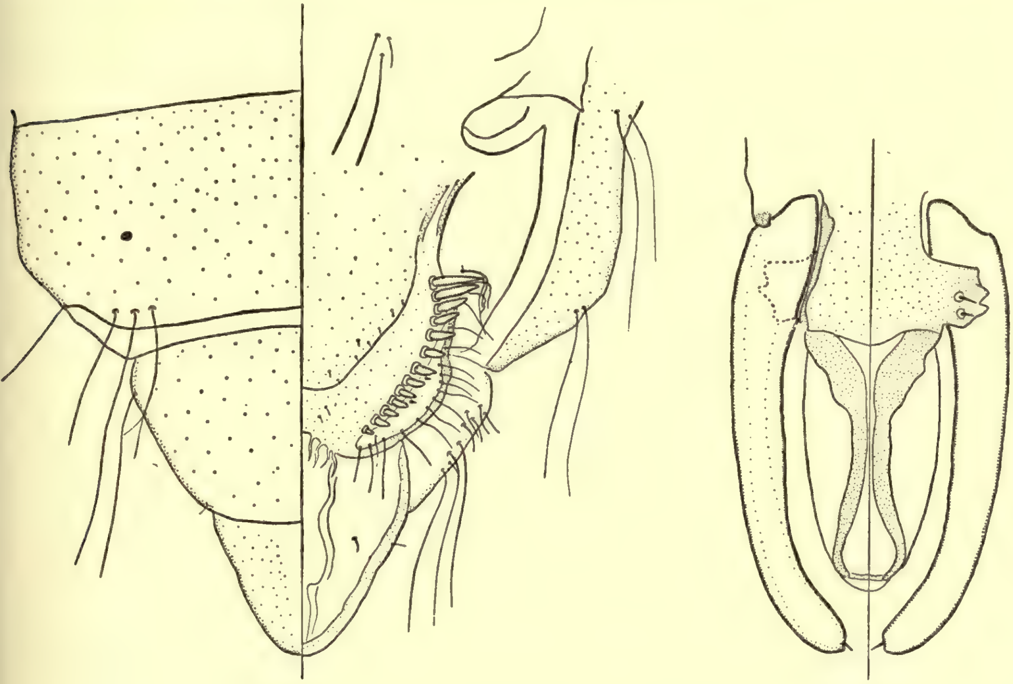


FIG. 24 FIG. 25

FIGS. 24–25. *Acidoproctus moschatae* (Linn.):
24. Terminal segments of ♀ abdomen. 25. Male genitalia.

Pediculus querquedulae (p. 612)

No description, and marked by Linné as not seen by him, but with a reference to '*Red. exper. t.* 12'. Redi's plate represents a *Trinoton* from '*Arzavola o Farquetola*' = *Anas crecca* Linn.

This species (Figs. 26–28; Pl. II, fig. 2) is similar to that figured by Ferris (1928: 226) as *Trinoton anserinum* (Fabricius), but differs in having fewer hairs in the brushes on the third femora and fourth sternites (Fig. 28) and on the genital region of the male (Fig. 26); the genital region of the female also shows minor differences (Fig. 27). The male genitalia are as represented by Ferris (1928, fig. 9 *e*) for a specimen from *Cygnus bewickii* Yarrell.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·86	1·27	0·90	1·33
Abdomen . .	2·95	1·44	3·26	1·69
Total . . .	5·45	..	6·10	..
Genitalia . .	2·27*	..	..	..

Neotype female and *neallotype* male of *Trinoton querquedulae* (Linn.): in Meinertzhagen collection (slide No. 4007) from *Anas c. crecca* Linn., from England. *Neopara-*

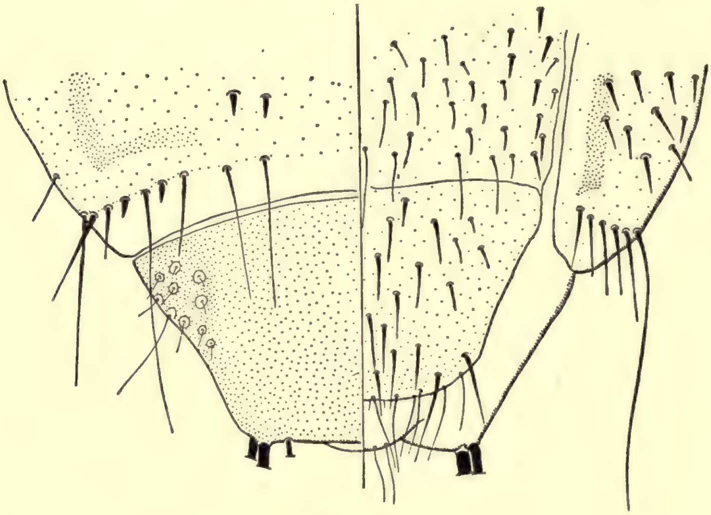


FIG. 26

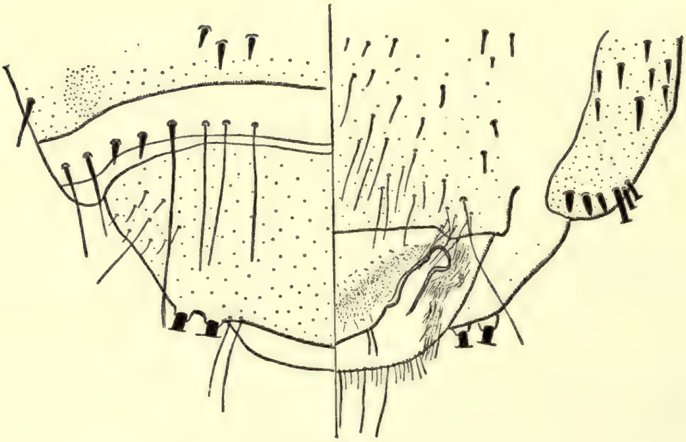


FIG. 27

FIGS. 26–27. *Trinoton querquedulae* (Linn.), terminal segments of abdomen: 26. ♂. 27. ♀.

types: 15 males and 12 females from the same host-form, England, Iceland, Kenya, Morocco, Nepal, and India (Rajputana).

Pediculus sternae (p. 612)

One of us (Clay, 1949:4) has already dealt with *Saemundssonia sternae* (Linn.) and has erected neotypes for it. The neotypes are from *Sterna h. hirundo* Linn.

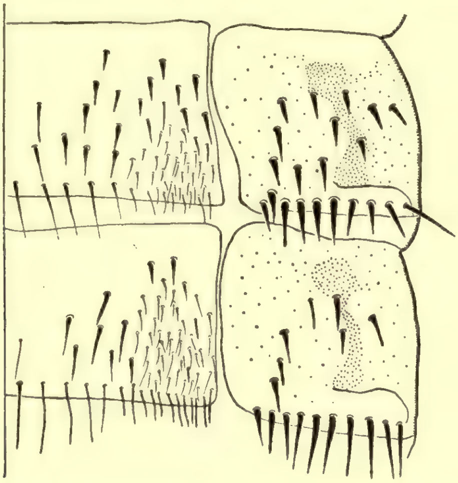


FIG. 28. *Trinoton querquedulae* (Linn.), fourth and fifth sternites, ♀.

Pediculus plataleae (p. 613)

There is no description, but a reference to Redi's plate 4. The host-record is '*in Leucorodiis*' and the secondary appellation *P. Plataleae Leucorodiae.* Linné had not seen the species.

The reference is erroneous, the only Spoonbill parasite figured by Redi being his '*Pollino del Palettone*', on plate 7 (*Pulex albardeolae* in the Latin edition). We have been unable to find any later reference that adds anything to our knowledge of the species until Giebel (1866: 384) described it as *Lipeurus platalearum.* The hosts were given by him as *Platalea ajlaja* and *leucorhodia*, but in 1874: 384 he dropped the former host-name. Harrison (1916: 17, 139) restored Linné's name and gave *platalearum* as a synonym. The species must stand as *Ardeicola plataleae* (Linné), 1758.

Our specimens of this species are from *Platalea leucorodia* from Jidda, Arabia, sufficient material not being available from the European Spoonbill. Although Eastern breeding birds have been separated as *P. l. major* Temminck and Schlegel on size, there is apparently considerable overlap in measurements, and it is doubtful whether this subspecies is recognizable; moreover, Redi obtained some of his material from non-Italian birds kept in the Boboli Gardens, and his Spoonbill may well not have been of the European form. We have, therefore, felt ourselves justified in erecting neotypes from Arabian breeding birds.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·59	0·35	0·61	0·38
Abdomen . .	1·60	0·42	1·74	0·52
Total . . .	2·80	. .	3·00	. .
Genitalia . .	0·60	. .	. .	. .

Neotype female (Pl. I, fig. 5 and Figs. 31–33) and *neallotype* male (Figs. 29–30, 32) of *Ardeicola plataleae* (Linn.), a female and male in the British Museum (Nat. Hist.) (slide No. 348) from *Platalea l. leucorodia* Linn. from Jidda, Arabia. *Neoparatypes*: 24 males and 26 females from the same host-form, Jidda and India (Rajputana).

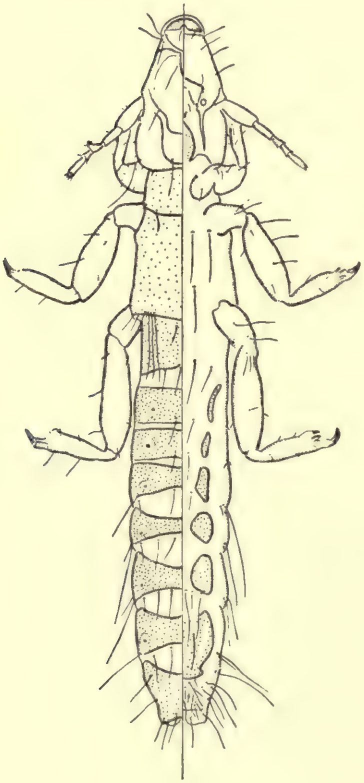


FIG. 29

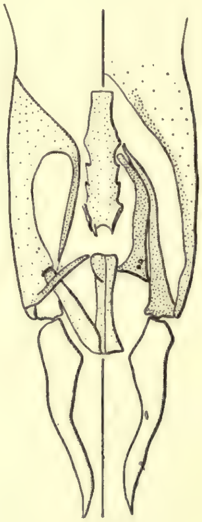


FIG. 30

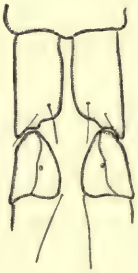


FIG. 31

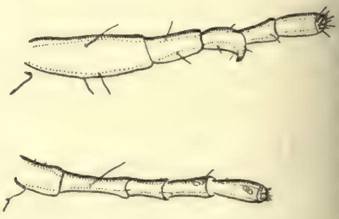


FIG. 32

FIGS. 29–32. *Ardeicola plataleae* (Linn.): 29. Male. 30. Male genitalia. 31. First two abdominal segments, ♀. 32. ♂ and ♀ antennae.

Neotype of *Ardeicola platalearum* (Giebel), a male (British Museum (Nat. Hist.), slide No. 420), from *Platalea l. leucorodia* Linn. from S. Spain, which agrees both with Giebel's description and with the neallotype of *A. plataleae* (Linn.).

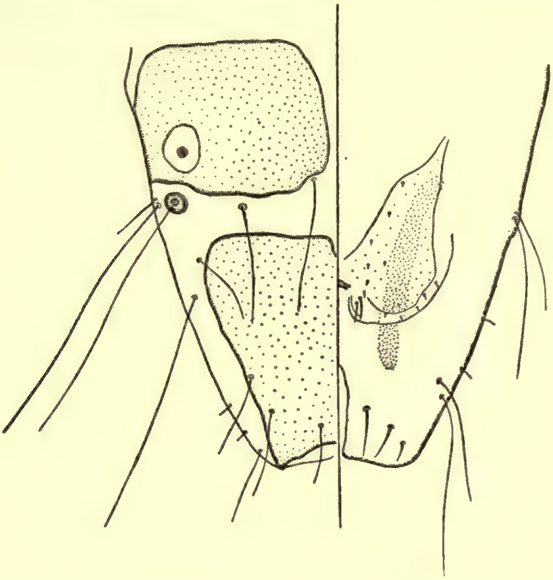


FIG. 33. *Ardeicola plataleae* (Linn.) ♀ terminal segments of abdomen.

Pediculus ardeae (p. 613)

Not seen by Linné, based on Redi's plate 6. The host-record is '*in Ardeis*' and the secondary appellation *P. Ardeae cinereae.*

Redi's plate 6 is a '*Pollino dell' Airone*', which is unquestionably the species now known as *Ardeicola ardeae* (Linné). It does not appear to have been found again until comparatively recent times, for the mentions in the literature are mere references until Stephens (1829: 332) quite unnecessarily renamed it *Lipeurus obtusus* and Burmeister (1838: 434) described it as *Lipeurus leucopygus.* Harrison's references (p. 130) to *ardeae-cinereae* Fabricius, 1794, and to *ardealis* Scopoli, 1763, are incorrect, for Fabricius' mention is a quotation of the reference for *ardeae* Linné and Scopoli's name refers to a totally different species which will be discussed later. Clay (1936: 615) made *ardeae* Linn. the type species of *Ardeicola.*

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·73	0·48	0·76	0·50
Abdomen . .	1·59	0·68	1·95	0·68
Total . . .	2·86	. .	3·24	. .
Genitalia . .	0·44	. .	. .	. .

Neotype male (Figs. 34–35) and *neallotype* female (Figs. 36–37) of *Ardeicola ardeae* (Linn.) in the British Museum (Nat. Hist.) (slide No. 423) from *Ardea c. cinerea* Linné, from Liguria, Italy. *Neoparatypes*: 46 males and 86 females from the same host-form, from Great Britain, Eire, Uganda, and South Africa.

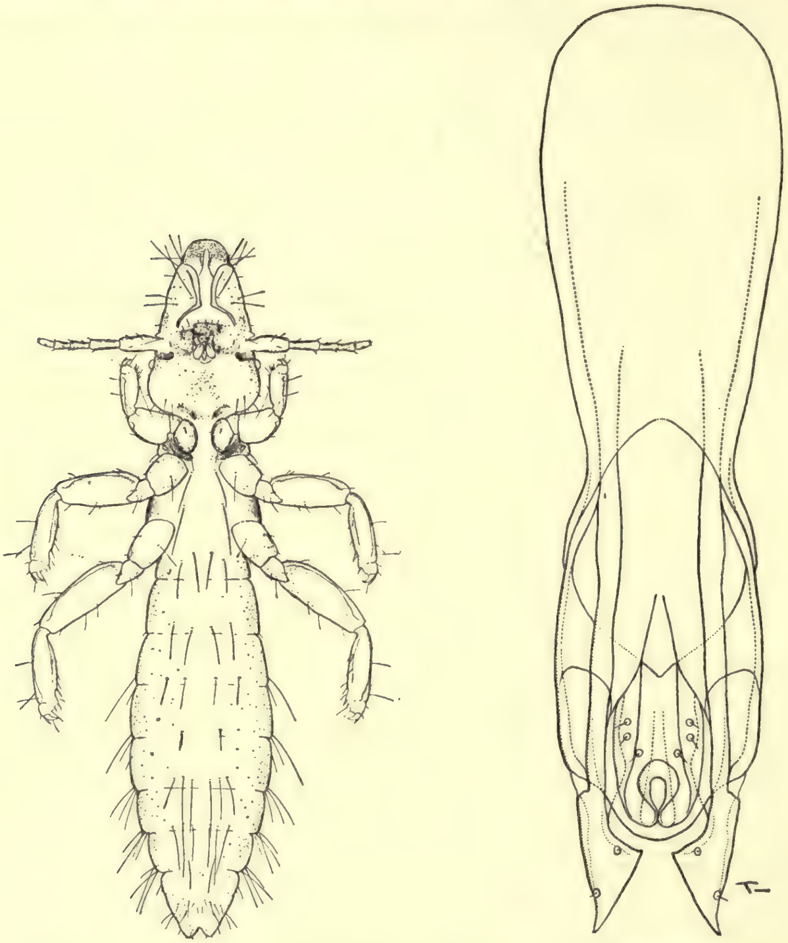


FIG. 34 FIG. 35

FIGS. 34–35. *Ardeicola ardeae* (Linn.) 34. Male. 35. Male genitalia.

These neotypes automatically become neotypes of *Ardeicola obtusus* (Stephens).

Neotype of *Ardeicola leucopygus* (Burmeister): a female (Meinertzhagen collection slide No. 211) from *Ardea c. cinerea* Linn. from South Uist, Outer Hebrides, Scotland, which agrees with the neallotype of *A. ardeae* (Linn.).

Pediculus gruis (p. 613)

No description, but a reference to No. 1162 in *Fauna Suecica* and to Redi's plate 3. The host-record is '*in Gruibus*' and the secondary appellation *P. Ardeae Gruis*. In *Fauna Suecica* there is a reference to '*Frisch. germ.* 5. *p.* 15. *t.* 4' and the host-record is 'in *Grue proprie dicta* 131'. Linné had not seen any material. Redi's plate is an absolutely unmistakable representation of the species which Harrison made the type species of his genus *Esthiopterum*, but that of Frisch shows a *Philopterus* (*s.l.*). Fabricius (1781: 481) gives a brief description of *gruis* which appears to have been drawn up from Redi's figure and which could be taken as a restriction of the name, as also must the fact that Linné dropped the reference to Frisch in 1758. Nitzsch (1818: 293) published the name *Ph.* (*Lipeurus*) *ebraeus*, but as this was also based on Redi's plate it is necessarily a synonym of *gruis* and our neotypes are those of both names. Giebel (1874: 226, pl. 16, figs. 5, 6) 'emended' the name *ebraeus* to *hebraeus*.

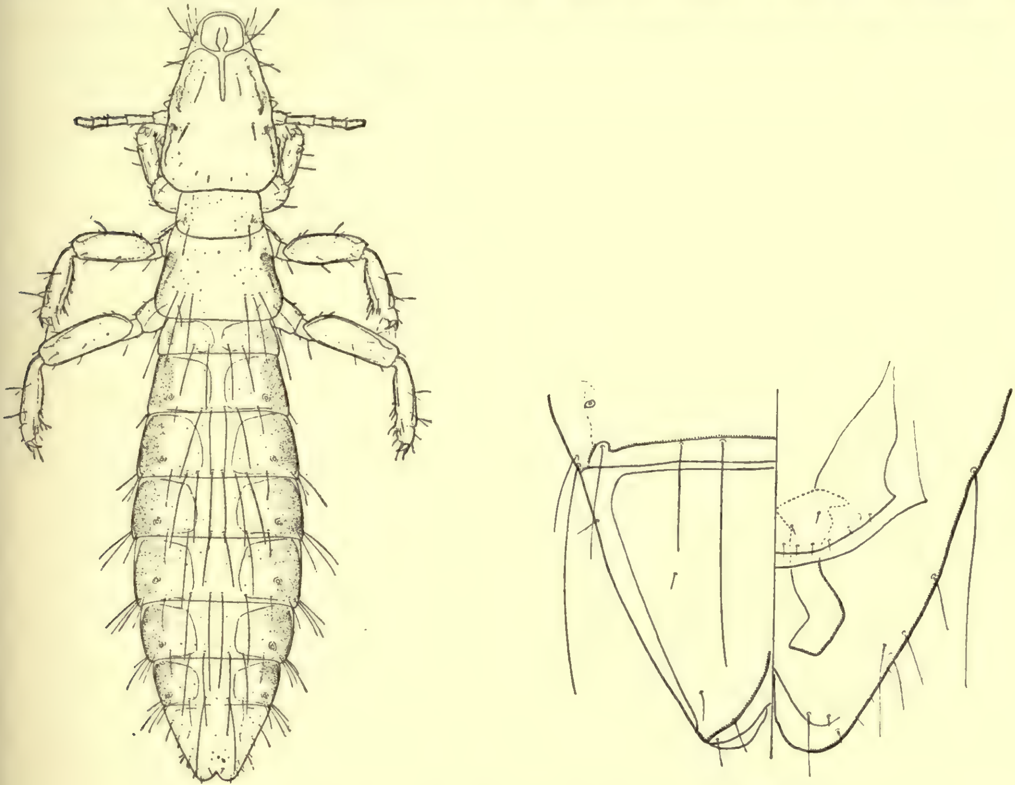


FIG. 36 FIG. 37

FIGS. 36–37. *Ardeicola ardeae* (Linn.): 36. Female. 37. Terminal segments of ♀ abdomen.

Measurements

	Male		Female	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	1·06	0·87	1·16	0·98
Abdomen . .	2·80	1·04	3·20	1·45
Total . . .	4·82	..	5·40	..
Genitalia . .	2·02*	..	..	..

Neotype male and *neallotype* female (Figs. 38–41) of *Esthiopterum gruis* (Linn.) in the British Museum (Nat. Hist.) (slide No. 407) from *Megalornis g. grus* (Linn.) from Genoa, Italy. *Neoparatypes*: 50 males and 57 females from the same host-form, from Germany, Finland, and Algeria.

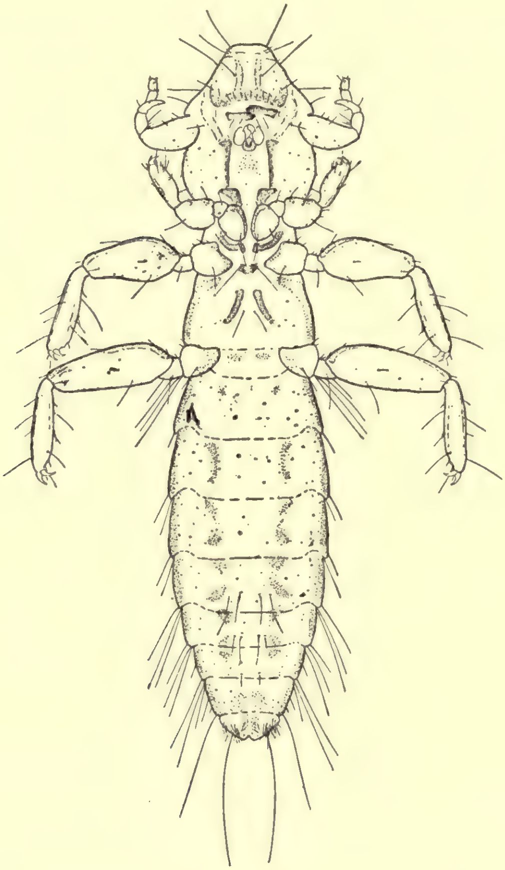


FIG. 38

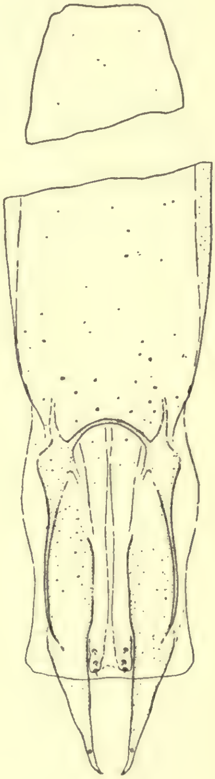


FIG. 39

FIG. 38–39. *Esthiopterum gruis* (Linn.): 38. Male. 39. Male genitalia.

It is perhaps not irrelevant to insert here a note as to the genus *Esthiopterum.* Harrison erected this genus (1916: 26) for species of *Lipeurus* which do not possess a circumfasciate head, *Esthiopterum* (*Lipeurus*) *ebraeum* Burmeister being designated type species. Later (1937: 25) he considered that the fact that he had included *Pseudonirmus charcoti* (Neumann), the type species of *Pseudonirmus* Mjöberg, in *Esthiopterum* made this genus a synonym of *Pseudonirmus* and he changed the name to *Esthiopterella* with *E. gruis* Linn. as type species. This view is quite incorrect and the name *Esthiopterella* is unnecessary and must be abandoned in favour of *Esthiopterum.*

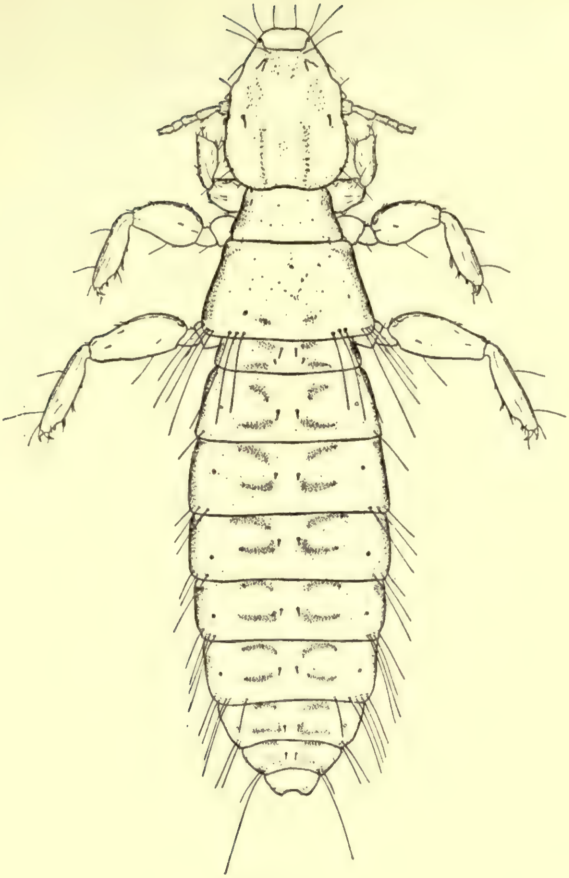


FIG. 40

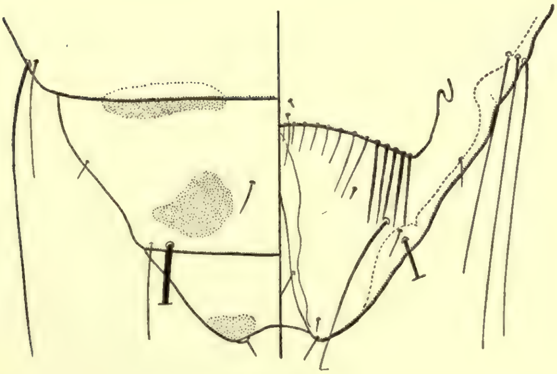


FIG. 41

FIGS. 40–41. *Esthiopterum gruis* (Linn.): 40. Female. 41. Terminal segments of ♀ abdomen.

Pediculus ciconiae (p. 613)

Although there is no description, Linné had seen specimens; the reference is '*Frisch. Ins.* 8. *p.* 9. *t.* 6', the host-record '*in Ciconiis*', and the secondary appellation *P. Ardeae Ciconiae.* Frisch's plate shows figures of a male and female *Ardeicola.*

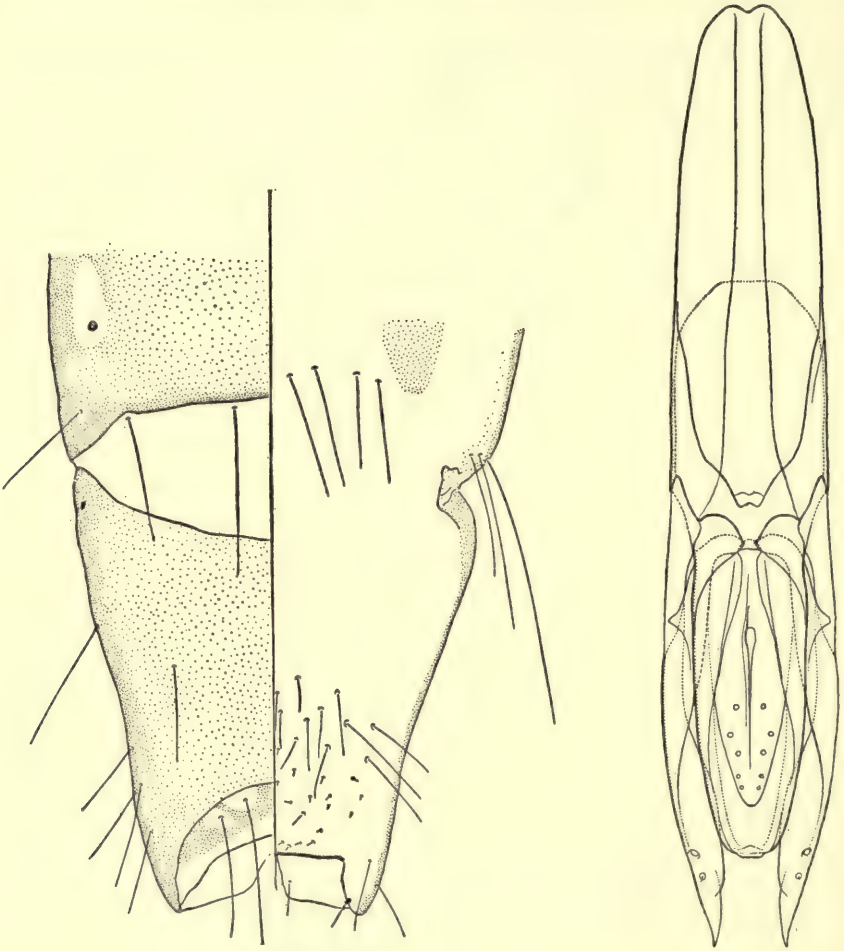


FIG. 42 FIG 43

FIGS. 42–43. *Ardeicola ciconiae* (Linn.) ♂: 42. Terminal segments of abdomen. 43. Genitalia.

Fabricius (1775: 808) described what is undoubtedly Linné's species as '*elongatus filiformis, abdomine albo: lateribus nigro punctatis*'. Nitzsch (1818: 292) renamed the species *Phil.* (*Lipeurus*) *versicolor,* and it was generally known under this name until Harrison restored Linné's name and transferred the species to *Esthiopterum.*

This species (Figs. 42–44; Pl. II, figs. 3–4) shows the characteristics of typical *Ardeicola* and is distinguished from related species by the shape of the head, terminal segments of the abdomen in both sexes, and the male genitalia. In the male tergal plates II–IV are divided medially, in the female tergal plates II–VIII are divided.

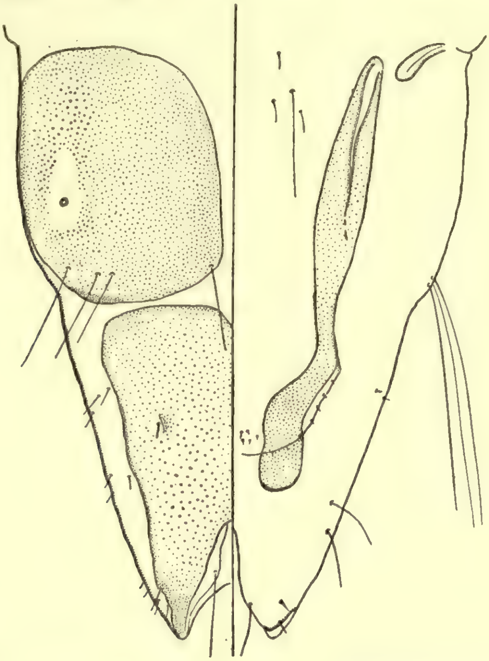


FIG. 44. *Ardeicola ciconiae* (Linn.) terminal segments of ♀ abdomen.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·93	0·58	0·95	0·58
Abdomen . .	3·12	0·77	3·00	0·80
Total . . .	4·70	. .	4·81	. .
Genitalia . .	1·36*	. .	. .	. .

Neotype male and *neallotype* female of *Ardeicola ciconiae* (Linn.) in the Meinertzhagen collection (slide No. 7857), from *Ciconia c. ciconia* (Linn.) from Sudan. *Neoparatypes*: 59 males and 45 females from the same host-form from Europe (captive bird), Sudan, Kenya, Uganda, and South Africa.

These neotypes are necessarily also neotypes of *Ardeicola versicolor* (Nitzsch).

Pediculus charadrii (p. 613)

No description, and marked by Linné as not seen by him, but with a reference to Redi's plate 9. The host-record is '*in Pluvialibus*' and the secondary appellation *P. Charadrii Pluvialis*.

Redi's plate 9 does not contain plover-parasites, but plate 11 shows two '*Pollini del Piviere*' (in the Latin edition '*Pulices avis Pluvialis*') and is obviously the reference intended by Linné; the upper or left-hand figure is an *Actornithophilus* and the other a *Quadraceps*.

Müller (1775: 1035) gives a very brief description of '*Die Grillvogellaus. P. charadrii*' which runs 'Sie hat ein eckiges Bruststück und ist an den Seiten gerändelt'. If this is an original description it seems to us completely meaningless; if we assume that it is a description of Redi's drawings rather than of actual specimens, then the angular '*Bruststück*' (? prothorax) seems to refer to the *Actornithophilus* but the margined sides seem more like the *Quadraceps*. We cannot regard anything so completely vague as a restriction.

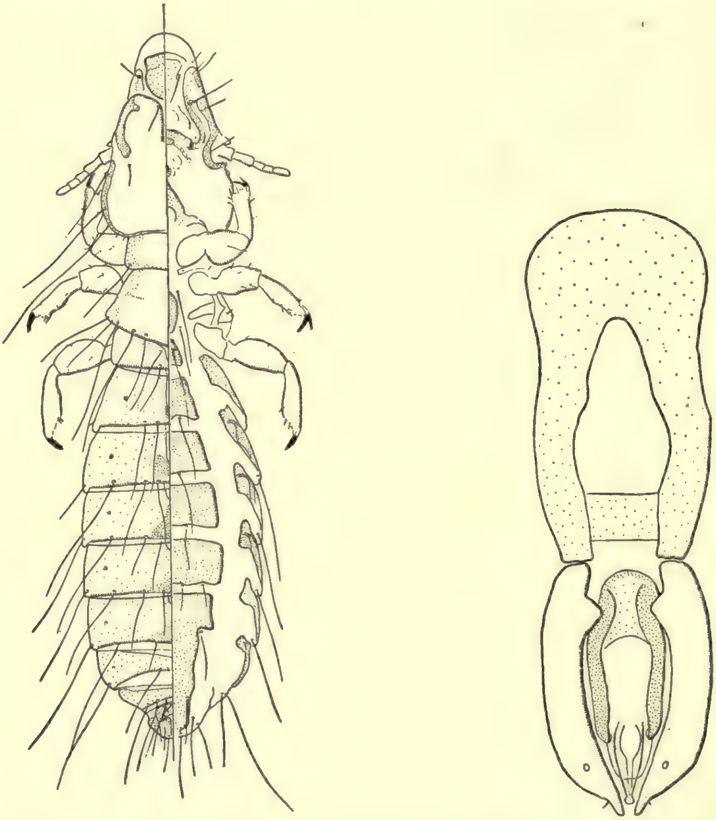


FIG. 45 FIG. 46

FIGS. 45–46. *Quadraceps charadrii* (Linn.): 45. Male. 46. Male genitalia.

Nitzsch (1818: 298) renamed the upper figure of Redi's plate as *Liotheum* (*Colpocephalum*) *ochraceum*; Harrison (1916: 12) rejects *charadrii* on the inadequate grounds that 'neither figure is specifically referred to'. In order not to disturb Nitzsch's name *L. ochraceum*, we restrict *charadrii* Linné to the lower or right-hand figure on Redi's plate; *ochraceum* will be dealt with under Nitzsch, 1818.

'*Piviere*' is the Italian vernacular name for *Charadrius apricarius* Linn., and *C. pluvialis* (the host mentioned by Linné) is a synonym. Two subspecies of *apricarius* occur as migrants to Italy, where Redi probably obtained his material, and we have chosen one of these as type-host of the louse.

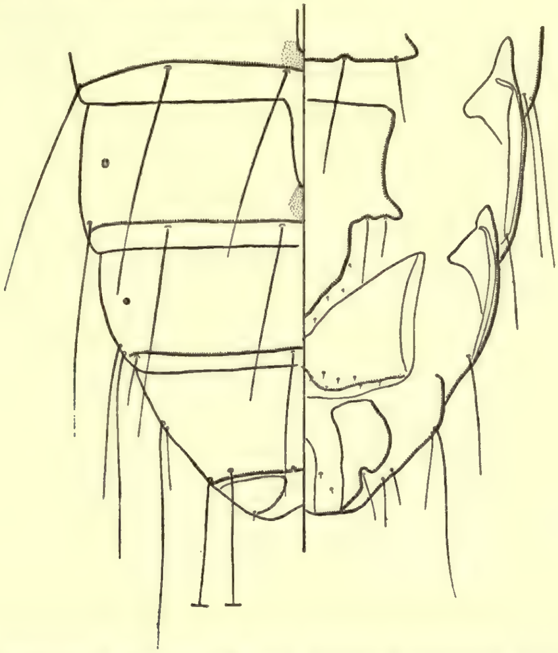


FIG. 47. *Quadraceps charadrii* (Linn.): terminal segments of ♀ abdomen.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·43	0·30	0·47	0·32
Abdomen . .	0·83	0·40	1·11	0·42
Total . . .	1·56	. .	1·90	. .
Genitalia . .	0·23	. .	. .	. .

Neotype male (Figs. 45–46) and *neallotype* female (Fig. 47, Pl. II, fig. 5) of *Quadraceps charadrii* (Linn.) in the Meinertzhagen collection (slide No. 11559) from *Charadrius apricarius oreophilus* A. C. Meinertzhagen from Scotland. *Neoparatypes*: 22 males and 10 females from the same host-form, Scotland and Ireland.

Pediculus fulicae (p. 613)

No description, and marked by Linné as not seen. The host-record is '*in Fulicis*' and the secondary appellation *P. Fulicae atrae*. The reference is to Redi's plate 4, which depicts three '*Pollini della Folaga*', a *Eulaemobothrion* (fig. I), a *Fulicoffula* (fig. II), and an *Incidifrons* (fig. III).

There is no formal restriction of *Pediculus fulicae* in the old literature. Müller (1775: 1035) states 'Sie führet am After viele gleichweitig stehende lange Härchen', which applies equally to all three genera; von Olfers (1816: 19) comes near to a restriction when he drops Redi's fig. 2 and suggests that figs. 1 and 3 are male and female of one species, but he still includes the *Eulaemobothrion* and the *Incidifrons*. But Schrank (1803: 191) describes as *Pediculus fulicae* a species from '*Blässhuhn*' (= *Fulica atra* Linn.) which is quite definitely the *Incidifrons* even without his reference to fig. 3 of Redi's plate, and the obvious course is to accept this as a restriction although he gives no reference to Linné. The matter has been dealt with at some length by one of us (Hopkins, 1940: 421, 422) and the name *fulicae* Linné formally restricted to the *Incidifrons*. The synonymy was also dealt with in the same paper.

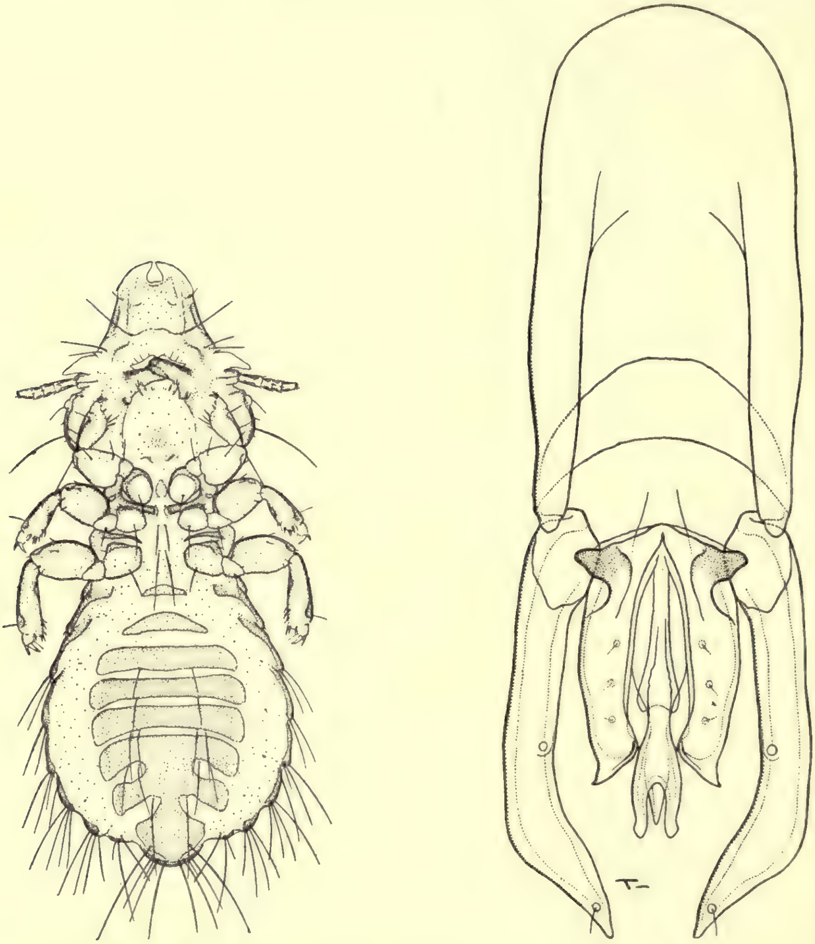


FIG. 48

FIG. 49

FIGS. 48–49. *Incidifrons fulicae* (Linn.): 48. Male. 49. Male genitalia.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·53	0·48	0·58	0·60
Abdomen . .	0·76	0·63	1·18	0·88
Total . . .	1·50	. .	2·03	. .
Genitalia . .	0·40	. .	. .	. .

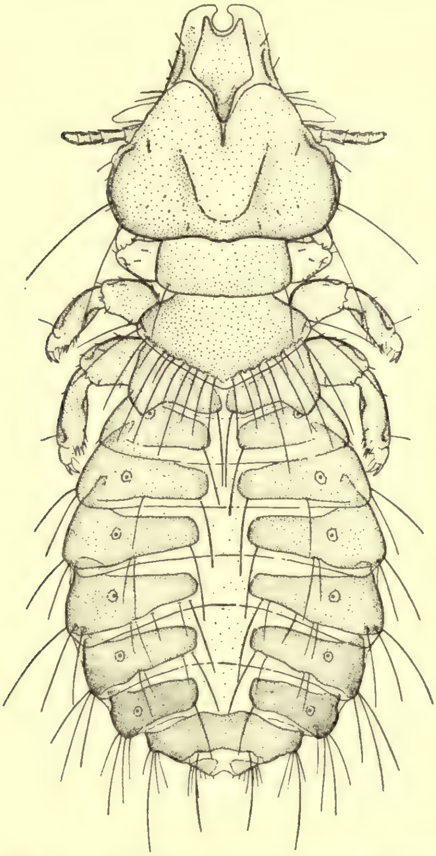


FIG. 50. *Incidifrons fulicae* (Linn.) female.

Neotype male (Figs. 48–49) and *neallotype* female (Figs. 50–51) of *Incidifrons fulicae* (Linn.) in the Meinertzhagen collection (slide no. 4941) from *Fulica a. atra* Linn. from England. *Neoparatypes*: 46 males and 53 females from the same host-form, from England, Scotland, India (Sind and Rajputana), Macedonia, Italy, and Morocco.

Neotype of *Incidifrons pertusus* (Burmeister): a male (Meinertzhagen collection slide No. 2934) from *Fulica a. atra* Linn. from England, which agrees with the neotype of *I. fulicae* (Linn.).

Pediculus recurvirostrae (p. 613)

There are references to *Fauna Suecica* and to '*It. oel.* 90' and Linné had seen the species. The host-record is '*in Recurvirostris*' and the secondary appellation *P. Recurvirostrae Avosettae.*

The description in *Fauna Suecica* is: '*Corpus fuscum, oblongum. Caput obsolete triangulum, acuminatum, linea transversalis excavata in medio. Abdomen oblongum, fere lineare, in medio paulo latius, incisuris octo. Pedes breves, curvi. Antennae breves, parvae, capitatae.*' The host-record is '*Habitat in* Numenio Recurvirostro albo nigroque-variegato. 137' (= *Recurvirostra avosetta* Linn.).

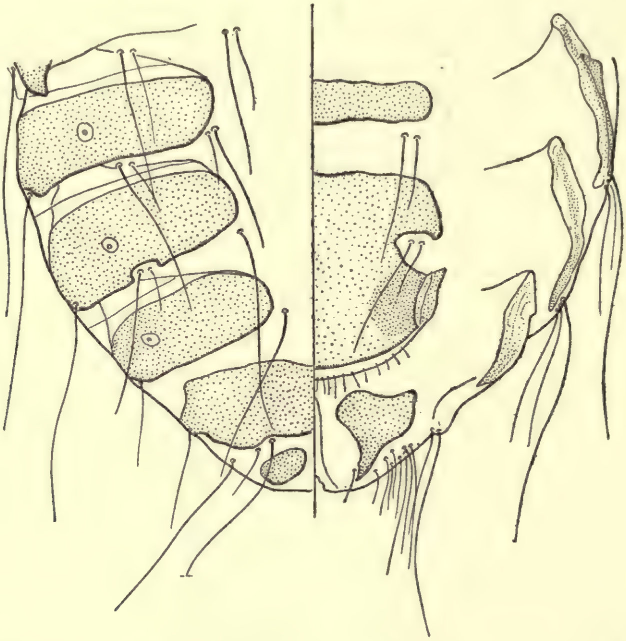


FIG. 51. *Incidifrons fulicae* (Linn.): terminal segments of ♀ abdomen.

The reference to *It. oel.* 90 (1745) is quite unhelpful; there is no mention of the Avocet on p. 90, but on p. 9 the bird is mentioned, with the remark '*om ganska mänga insekter*'.

J. C. Fabricius (1775: 808) refers to Linné and gives a description which appears to be an abbreviation of Linné's. Later authors have mentioned the species without being able to decide as to what it is, and Harrison (1916: 18) places it in *Degeeriella* but rejects it as unrecognizable.

Of the species known from *Recurvirostra avosetta*, those later described as *Nirmus pileus* Nitzsch and *N. signatus* Piaget could each be regarded as having an almost linear abdomen in the female sex, whereas none of the other species (nor the males of these two) could well be so described. *N. pileus* is the only one in which the female has a *corpus fuscum*, its head is more triangular than that of any of the other species, and it is the only one in which we would describe the head as acuminate. The *linea* *transversalis excavata in medio* on the head is found in both *pileus* and *signatus*, though it is plainer in the latter. The eight incisions on the abdomen are present in both species and the antennae are not capitate in either but can appear so in both when the insect is examined with a hand-lens.[1] The legs are more obviously short in *pileus*. The balance of probability is strongly in favour of Linné's insect having been *N. pileus* Nitzsch (as figured by Piaget, 1880). The species is very aberrant and may require a new genus, but we refer it provisionally to *Quadraceps*.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·61	0·59	0·68	0·67
Abdomen . .	1·50	0·65	2·32	0·98
Total . . .	2·62	. .	3·60	. .
Genitalia . .	0·52*	. .	. .	. .

Neotype female (Figs. 52–53) and *neallotype* male (Figs. 54–55) of *Quadraceps recurvirostrae* (Linn.) in the Meinertzhagen collection (slide No. 11011) from *Recurvirostra a. avosetta* Linn. from Russia. *Neoparatypes*: 49 males and 27 females from the same host-species from Russia, Palestine, Turkey, Kenya, and South Africa.

Neotype of *Quadraceps pileus* (Nitzsch): a male (Meinertzhagen collection, slide No. 8024) from *Recurvirostra a. avosetta* Linn. from Palestine, which agrees with the neallotype of *Q. recurvirostrae* (Linn.).

Pediculus haematopi (p. 613)

The species is not described, but there is a reference to *Fauna Suecica* and Linné had seen material. The host-record is '*in Haematopis*' and the secondary appellation *P. Haematopi Ostralegi*.

In *Fauna Suecica* the host is given as *Haematopus bellonii* and the species is described as: '*Magnitudo pulicis. Totus glaucus. Caput subrotundum, glaberrimum, convexo-planum. Abdomen obverse ovatum incisuris decem, transversis, pallidis. Pedes breves. Antennae brevissimae. Thorax angustissimus. Pili ad latera posterioris abdominis.*'

Subsequent authors add nothing to our knowledge of this species, but Gmelin (1788: 2919) altered the name to *haematopodis* and was followed in this by Fabricius (1805: 347); Stephens (1829: 332) renamed it *Nirmus glaucus*. Harrison (1916: 15) discards it on the grounds that the genus is not recognizable with certainty, but even if this were adequate we claim that his belief is incorrect; the description definitely indicates the Ischnocera and of the Ischnocera parasitic on the Oyster-catcher only the species mentioned by Giebel in 1866 (p. 361) as *Docophorus Haematopi* (a *nomen nudum*) and described by him in 1874 (p. 101) as *Docophorus acanthus* agrees at all with the description in *Fauna Suecica*. Linné's specimen appears to have been a nymph or perhaps a teneral adult.

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[1] We considered the possibility that this character might mean that Linné's material belonged to the Amblycera, but other points in the description are irreconcilably at variance with this suggestion.

Details of both sexes of *Docophorus acanthus* have been well figured by Kéler (1936: 263, figs. 2 *b*, 2 *d*) as the type species of *Hastaephorus* (= *Saemundssonia* Timmermann).

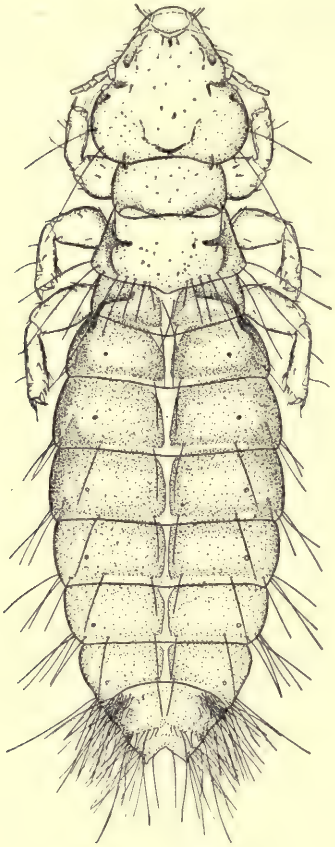

FIG. 52

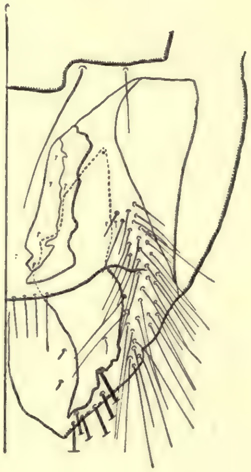

FIG. 53

FIGS. 52–53. *Quadraceps recurvirostrae* (Linn.): 52. Female. 53. Terminal segments ♀ abdomen.

Neotype male and *neallotype* female of *Saemundssonia haematopi* (Linn.) a pair, agreeing with Kéler's figures referred to above, in the Meinertzhagen collection (slide No. 10568) from *Haematopus o. ostralegus* Linn. from Ireland. *Neoparatypes*: 34 males and 43 females from the same host-form from Great Britain and Eire.

The neotypes are automatically neotypes of *Saemundssonia haematopodis* (Gmelin) and *Saemundssonia glaucus* (Stephens), also.

Neotype of *Saemundssonia acanthus* (Giebel), a male (Meinertzhagen collection, slide No. 2352) from *Haematopus o. ostralegus* Linn. from Scotland, which agrees with the neotype of *S. haematopi* (Linn.).

Pediculus pavonis (p. 613)

No description and marked by Linné as not seen, but with references to '*Frisch. ins.* 12. *t.* 3. *f.* 6' and Redi's plate 15. The secondary appellation is *P. Pavonis cristati.*

There has never been any serious dispute about this species; Frisch's figure represents a female *Goniodes* and Redi's shows a young nymph of the same species. Later authors add very little of value, but Gmelin (1788: 2919) adds an erroneous reference to Geoffroy (1762), whose species is a turkey-parasite. Nitzsch (1818: 293) proposed the name *Phil.* (*Goniodes*) *falcicornis* for *Pediculus pavonis* Linn. and Fabr., and added references to Panzer (1798) and Redi plate 14 (an adult male of the same species).

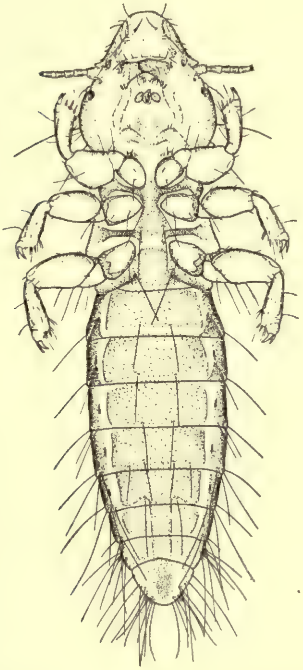

Fig. 54

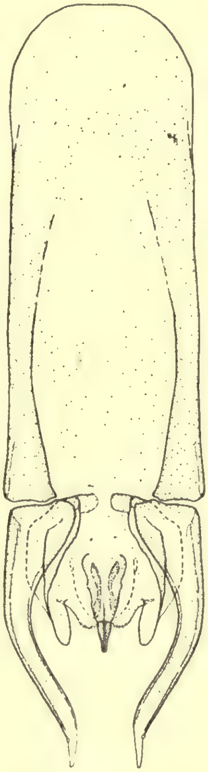

Fig. 55

Figs. 54–55. *Quadraceps recurvirostrae* (Linn.): 54. Male. 55. Male genitalia.

Neotypes of *Goniodes pavonis* (Linn.) have already been designated by one of us (Clay, 1940: 7). These specimens are also neotypes of *Goniodes falcicornis* (Nitzsch).

Pediculus meleagridis (p. 613)

There is no description, but there are references to *Fauna Suecica* and '*Frisch. ins.* 8. *t.* 4' and a queried reference to Redi's plate 22. The host-record is '*in Gallo-pavonibus*' and the secondary appellation is *P. Meleagridis Gallo-pavonis.* Linné had seen specimens.

As the reference to Redi is queried we can leave it out of account; Frisch's figure certainly represents the common *Chelopistes* of the Turkey. In *Fauna Suecica*, 1746, there is a description and a reference (dropped in 1758) to Redi's plate 1; the description seems certainly to refer to the turkey *Chelopistes* and the left-hand figure on Redi's plate 1, though nominally a hawk-parasite, shows a strong resemblance to the same species.

Geoffroy (1762: 600) called the species *Pediculus galli-pavonis*, but (as will be shown below) this, in spite of appearances, is not a name, and his description is merely a translation of that in *Fauna Suecica*. Schrank (1781: 504, pl. 1, fig. 4) described and figured it under Linné's name; though he questioned whether his species was the same as that of Linné, there is no doubt that it was. In 1818 (p. 294) Nitzsch proposed *Ph.* (*Goniodes*) *stylifer* as a *nomen novum* for *P. meleagridis* Schrank, and it has many times been described under this name and the 'emendation' *styliferum* Taschenberg. Harrison (1916: 16, 77) restored Linné's name.

Neotypes of *Chelopistes meleagridis* (Linn.) have already been selected (Clay, 1941: 124). They are not neotypes of *C. stylifer* (Nitzsch) nor of *C. styliferum* (Taschenberg), because the former is a renaming of *Pediculus meleagridis* Schrank (not of *P. meleagridis* Linn., although these are the same) and the latter has an independent description.

Pediculus gallinae (p. 613)

There is a very brief description '*thorace capiteque utrinque mucronato*' and a reference to *Fauna Suecica*, where there is a more detailed description. The secondary appellation is *P. Phasiani Galli* and the host-record is '*in Gallinis domesticis*'. The species was redescribed and figured under Linné's name by Schrank (1776: 114, pl. 5, fig. 2) and by Panzer (1798: 21); Nitzsch (1818: 299) proposed the name *Lio.* (*Menopon*) *pallidum* for it, quoting Redi plate 17 and Panzer, but not Linné. There has never been any real doubt about the identity of the species.

Menopon gallinae (Linn.) has been very well figured by Ferris (1924: 57, fig. 1), but in the male genitalia the 'parameres' of Ferris should have bulbous ends and the structure 'X' is in fact a paired structure, as shown in Fig. 56, X.

Neotype male and *neallotype* female of *Menopon gallinae* (Linn.) in the Meinertzhagen collection (slide No. 2490) from *Gallus domesticus* from Scotland; these specimens agree with Ferris's figures (referred to above) except for the details of the male genitalia mentioned. *Neoparatypes*: 24 males and 47 females from the same host from Great Britain, Roumania, Uganda, British Guiana, and Colombia. These neotypes are not also neotypes of *Menopon pallidum* (Nitzsch) because Nitzsch did not include Linné among his references.

Neotype of *Menopon pallidum* (Nitzsch) a male (Meinertzhagen collection, slide No. 4920) from *Gallus domesticus* from England, which agrees with the neotype of *M. gallinae* (Linn.).

Pediculus caponis (p. 614)

The host-record and secondary appellation are the same as for *gallinae*. There are references to '*Frisch. ins.* 11. *t.* 24', to Redi's plate 16, fig. 1, and to *Fauna Suecica*. Frisch's figure is a *Laemobothrion* and the upper figure on Redi's plate 16 is *Menopon* *gallinae* (Linn.), but the description in *Fauna Suecica* is undoubtedly a *Lipeurus* and the name has long been accepted in this sense. The first author to note the discrepancy was Schrank (1803: 193); he notes that neither of the figures to which Linné referred are this species and gives a short new description which definitely refers to the *Lipeurus* and which should be accepted as a restriction of the previously composite *P. caponis* Linn. In any case we must go by what Linné had before him, as indicated by his description, and not by his errors. Fortunately application of the name *caponis* to the *Lipeurus* is in accordance with modern usage.

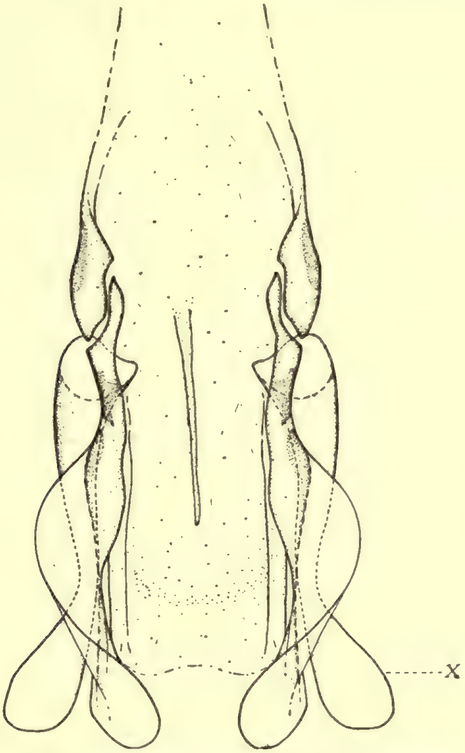

FIG. 56. *Menopon gallinae* (Linn.): ♂ genitalia.

The species has been described and figured in detail by one of us (Clay, 1938: 112, figs. 1, 2 *a*, *b*, 3 *a*). Synonymy was discussed in the same paper, but we wish to add that *Nirmus tesselatus* Denny, described from a nymph supposedly obtained from a bittern, is a *Lipeurus* and should be assumed to be *L. caponis* (Linn.), as it probably actually is (*see* Clay, 1940: 431).

Neotype male and *neallotype* female of *Lipeurus caponis* (Linn.) in the Meinertzhagen collection (slide No. 4930), selected from the material utilized for Clay's redescription and figures (Clay, 1938), from *Gallus domesticus*, Great Britain. *Neoparatypes*: 19 males and 18 females from the same host-form and locality.

Neotype of *Lipeurus variabilis* Burmeister: a male (Meinertzhagen collection, slide No. 2488) from *Gallus domesticus* from Great Britain which was compared with the type of *L. variabilis* by Dr. S. Kéler in 1936, and which agrees with the neotype of *L. caponis* (Linn.).

Pediculus tetraonis (p. 614)

There is no description and a reference to Redi is queried, so *tetraonis* is a *nomen nudum* so far as the publication under consideration is concerned, but Linné described the species in the 1761 edition of *Fauna Suecica* and it will be dealt with under that work.

Pediculus lagopi (p. 614)

Linné gives a reference to a description in *Fauna Suecica* and the secondary appellation is *P. Tetraonis Lagopi.*

Harrison (1916: 15) discarded the name as unrecognizable, but Waterston (1926: 89–91) showed conclusively that the mention of the fruits of *Capsella bursa-pastoris* and *Veronica* constitutes an unmistakable reference to the shape of a *Goniodes* and that *Goniodes lagopi* (Linn.) must replace the various other names that have been applied to the *Goniodes* of *Lagopus lagopus.*

Neotype of *Goniodes lagopi* (Linn.), selected by Clay (1940: 48), in the Meinertzhagen collection (slide No. 1576), from *Lagopus l. lagopus* (Linn.), from Estonia. The synonymy was dealt with in the same paper. The neotype of *Goniodes lagopi* (Linn.) is also automatically the neotype of *G. lagopodis* (Gmelin).

Pediculus columbae (p. 614)

Without description, and marked as not seen, but with a reference to '*Red. exper. t.* 2 *f.* 1'. The host-record is '*in Columbis*' and the secondary appellation is *P. Columbae Oenatis.*

Redi's plate is not good but the figure to which Linné refers is quite obviously a *Columbicola*; it is labelled '*Pollino del Piccion grosso*' (in the Latin edition '*Pulex Columbae majoris*'). As Linné had not seen specimens his mention of *Columba oenas* cannot be accepted as a designation of a type-host unless there is some confirmation, for the name owes all its validity to Redi's plate. But we consider it more than probable that the mention of *C. oenas* is not only unwarranted but erroneous. On the same plate Redi shows a '*Pollino della Tortora*' (a mite), and this suggests very strongly that '*Piccion grosso*' is merely used in contrast to the Turtle-dove and applies to the domestic pigeon. The latter is by far the most likely host of Redi's specimens, and it was from this host that all other authors redescribed the species for many years after. Eichler (1941: 276) designated *C. livia domestica* as type-host of the species; although this action has no validity (since Eichler did not erect neotypes), it is an additional reason for making this species the host of the neotypes.

Geoffroy (1762: 599) redescribed the species, but his 'name' for it is a descriptive phrase and not binominal; Fabricius (1775: 809) redescribed it under Linné's name. Schrank (1776: 114, pl. 5, fig. 3) had been unable to consult Redi's work and therefore doubted if his species was the same as that of Linné, whose name he applied to it, but his figure shows a nymph of the same species. Nitzsch (1818: 293) proposed the name *Ph.* (*Lipeurus*) *baculus* for the species shown on Redi's plate and '*Ped. columbae*

Panzer'; his host-record is '*Columbarum plur.*', for which must be substituted *C. livia domestica*.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·52	0·28	0·55	0·28
Abdomen . .	1·24	0·35	1·62	0·38
Total . . .	2·14	. .	2·62	. .

Neotype male (Figs. 57–58) and *neallotype* female (Fig. 59) of *Columbicola columbae* (Linn.) in the British Museum (Nat. Hist.) (slide No. 409–410) from *Columba livia domestica* from Florence, Italy. *Neoparatypes*: 42 males and 54 females from the

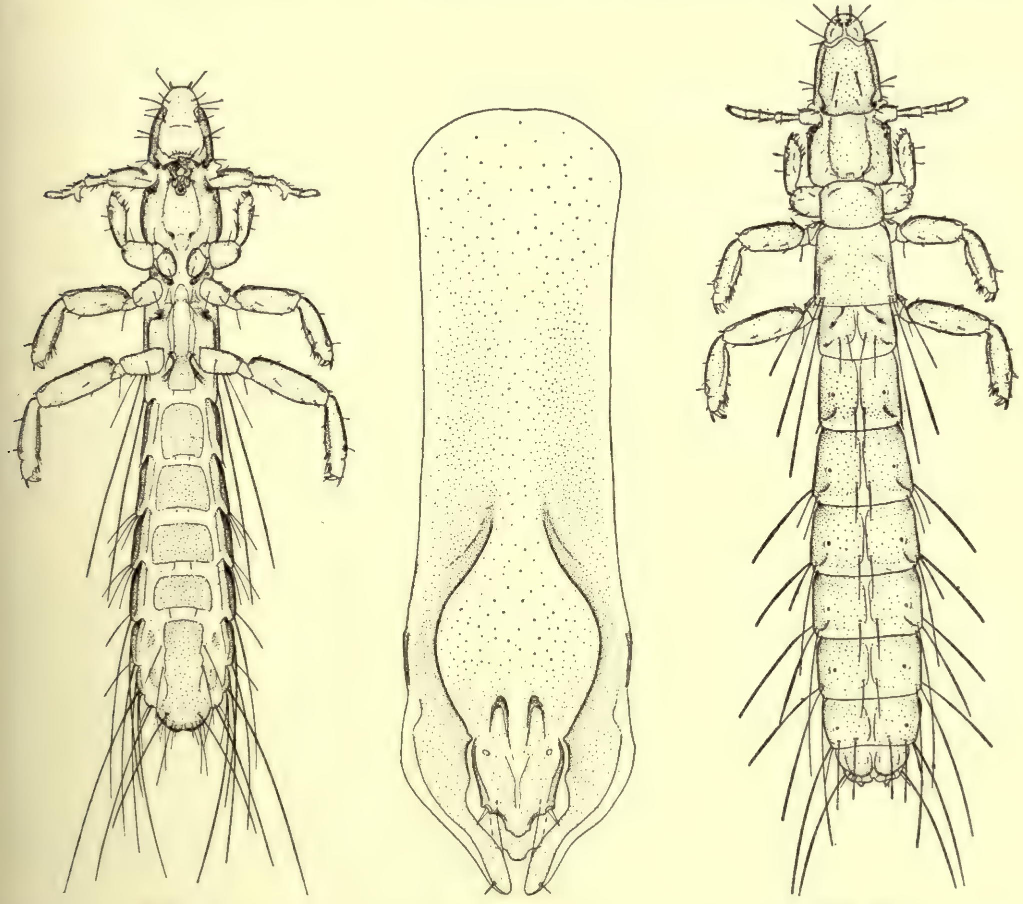

FIG. 57 FIG. 58 FIG. 59

FIGS. 57–59. *Columbicola columbae* (Linn.): 57. Male. 58. ♂ genitalia. × 342. 59. Female.

same host-form from Italy and London and from *Columba l. livia* Linn. from the Orkney Isles.

Because of the reference to Panzer, the neotypes of *Columbicola columbae* are not also automatically neotypes of *C. baculus* (Nitzsch), but we select the male as lectotype of the latter name.

Pediculus pari (p. 614)

There is a very brief description: 'cauda quadriseta; and a reference to '*Frisch. ins.* 8. *p.* 9. *t.* 1. *f.* 5.' This is not a member of the Mallophaga. It is perhaps a mite.

LINNÉ, 1761 (*Fauna Suecica*: 476–479)

Besides the names dealt with below, this work also contains three other appellations which must be mentioned: under *Pediculus meleagridis* the reference to Redi, t. 1, f. 2, is followed by the words '*Pediculus Accipitris*', under *Pediculus caponis* the reference to Redi, t. 16, is followed by '*Pulex capi*', and that to Frisch 11: 24 by '*Pediculus galli*'. In the case of Redi's plates it is clear that Linné copied the captions of the plates in the Latin edition except for the change of *Pulex accipitris* to *Pediculus Accipitris*; in fact, throughout this 1761 edition of *Fauna Suecica* all references to Redi's plates are followed by the caption appearing in the Latin edition of Redi, but in nearly all cases Linné retained the genitive of the host-name (e.g. '*tinnunculi*', '*caponis*') as the specific portion of the insect's name. The case of the mention of '*galli*' under Frisch is less clear; the reference is to Frisch's '*Hüner-Geyer-Laus*', which is presumably the *Hühnergeier-Laus*, or louse of *Circus aeruginosus*, and Frisch's figure supports this presumption, for (in spite of a discrepancy in size) it apparently represents a *Laemobothrion*. One must suppose that Linné, intending to give a Latin translation of the German name used by Frisch, translated only part of it, i.e. '*Hüner-Laus*' = *Pediculus galli*—possibly Linné thought that '*Hüner-Geyer*' represented two bird-species,[1] whereas it is in fact the name of one species.

Taking into account Linné's system of nomenclature, there seems no doubt that *Pediculus accipitris*, *P. capi*, and *P. galli* are merely Latin translations of the original Italian and German names and must, therefore, be considered as vernacular names.

Pediculus tauri (p. 476)

The brief description given in 1758 (p. 611) for *Pediculus bovis* is repeated, together with the reference to No. 1155 in the 1746 edition of *Fauna Suecica* and the five-line description given in the latter work. *Pediculus tauri* is, therefore, an unnecessary *nomen novum* for *Pediculus bovis* (Linn.).

The neotypes of *Damalinia bovis* (Linn.) are automatically also neotypes of *Damalinia tauri* (Linn.).

Pediculus tetraonis (p. 478)

This species, included in 1758 as a *nomen nudum*, has here a description that unquestionably refers to a *Goniodes*. *Goniodes tetraonis* Denny (*partim*) and *G. heterocerus* Nitzsch are synonyms of *G. tetraonis* (Linn.).

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[1] As Harrison did in such cases as *Ardea ciconia, Motacilla troglodytes, Hirundo apus,* and *Coracias oriolus.*

Neotype of *Goniodes tetraonis* (Linn.), erected by Clay (1940: 42), in Meinertzhagen collection (slide No. 1572) from *Lyrurus t. tetrix* (Linn.) from Estonia.

Pediculus hirundinis (p. 479)

The insect is described as '*pallescens, abdomine obovato albo nigro contaminato lateribus setis posticis majoribus. Habitat in Hirundine apode.*'

Only two genera are known from the Apodidae, for *Menopon parvulum* Piaget is a *Menacanthus* and the host-record almost certainly erroneous. Not only does Linné's description fit *Dennyus* much better than *Eureum* (which has an almost circular abdomen), but *Eureum* appears to be extremely rare[1] and is most unlikely to have been the species observed by Linné.

We have, therefore, no hesitation in deciding that *Pediculus hirundinis* Linné must have been a *Dennyus*.

The subsequent history of the name is peculiar. J. C. Fabricius (1775: 810) copied from *Fauna Suecica* the name, host-record, and part of the description, slightly re-worded ('*pallescens, abdomine albo, nigro maculato*', '*Abdominis latera setosa*'), and Schrank (1803: 810) got very completely muddled over the name. He first described (p. 193) as *Pediculus hirundinis* a species that he claimed to be the one described in *Fauna Suecica* and then (p. 194) described a *Pediculus prognes* that he asserted to be *Pediculus hirundinis* Fabricius *nec* Linné; his host-record for both names is *Hirundo urbica*. *Pediculus hirundinis* Schrank and *P. prognes* Schrank will be dealt with under that author's work, and we need only note here that *Pediculus hirundinis* Fabricius does not exist (being *P. hirundinis* Linn.), that the host mentioned by both Linné and Fabricius is *Hirundo apus*, now known as *Apus apus* (Linn.), and not any member of the Hirundinidae, and that neither of Schrank's species is *Dennyus hirundinis* (Linn.).

The species was redescribed by von Olfers in 1816 as *Nirmus truncatus*, which will be dealt with under his work. Denny (1842: 202, 231, pl. 22, fig. 5) redescribed it as *Nitzschia burmeisteri* and Nitzsch (in Giebel, 1866: 391) as *Menopon pulicare*. But Denny (1842: 231) and Giebel (1861: 304) had mentioned *M. pulicare*, without description, as a synonym or alternative name for *Nitzschia burmeisteri* Denny; its status is, therefore, that of an unwanted *nomen novum* for *N. burmeisteri* and Denny's types are necessarily also types of *Dennyus pulicare* (Denny). Piaget (1880: 574, pl. 48, fig. 6) redescribed the species as *Nitzschia pulicaris* N.; the specimens (4 males and 2 females, slides no. 1279–1282) in the British Museum (Piaget Collection) on which he based his description and figures agree with the neotypes of *hirundinis* (Linn.). Piaget also described a *Nitzschia tibialis* (loc. cit.: 576) from *Cypselus murarius* (*Apus a. apus*). There are no specimens in the collection labelled with this name or from the type host, but there seems little doubt that it is the same species and the name, therefore, should be considered as a synonym of *hirundinis* (Linn.).

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[1] Denny and Nitzsch had only two specimens each, Piaget and Ewing one each. On the 152 specimens of Apodidae that have been examined by the present writers only five specimens of *Eureum* have been found.

Measurements

	Male		*Female*	
	Length	*Breadth*	*Length*	*Breadth*
	mm.	mm.	mm.	mm.
Head . . .	0·48	0·68	0·52	0·72
Abdomen . .	1·43	0·92	1·83	1·16
Total . . .	2·49	. .	3·00	. .
Genitalia . .	0·79*	. .	. .	. .

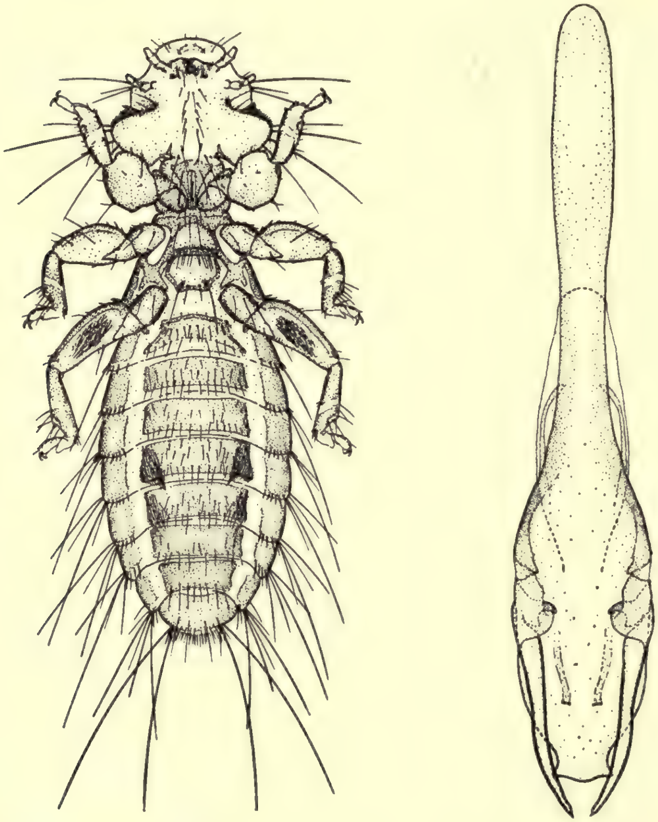

FIG. 60 FIG. 61

FIGS. 60–61. *Dennyus hirundinis* (Linn.): 60. Male. 61. ♂ genitalia.

Neotype male (Figs. 60–61) and *neallotype* female (Figs. 62–63) of *Dennyus hirundinis* (Linn.) from *Apus apus apus* (Linn.) from Suffolk, England (Meinertzhagen collection, slide No. 3982). *Neoparatypes*: 34 males and 33 females from the same host-form, England, Scotland, Eire, France, Estonia, Asia Minor, and Kenya.

Lectotype of *Dennyus burmeisteri* (Denny): male in the British Museum (Denny collection) (slide No. 798) from *Cypselus apus* [= *Apus a. apus* (Linn.)], Britain. *Paratypes*: 1 male and 2 females from the same host-form and locality.

GEOFFROY, 1762 (*Histoire abrégée des Insectes:* 598–605)

The 'names' contained in this work are not binominal, being descriptive phrases, and therefore not in accordance with Article 15 of the International Rules of Zoological Nomenclature. They are thus invalid. Dr. Jordan very kindly confirms our opinion with regard to this, and points out that Geoffroy, in his introduction, explains that in his opinion there are really no species separate from one another, that if we had all the material they would intergrade (an amazingly modern viewpoint!), and that for this reason he does not give names to species. Most of the phrases which have a greater appearance of being names have been published in valid form by later authors, and these will be dealt with in their proper place; some (such as '*Pediculus albo nigroque varius*') are so obviously not names that no attempt has ever been made to employ them.

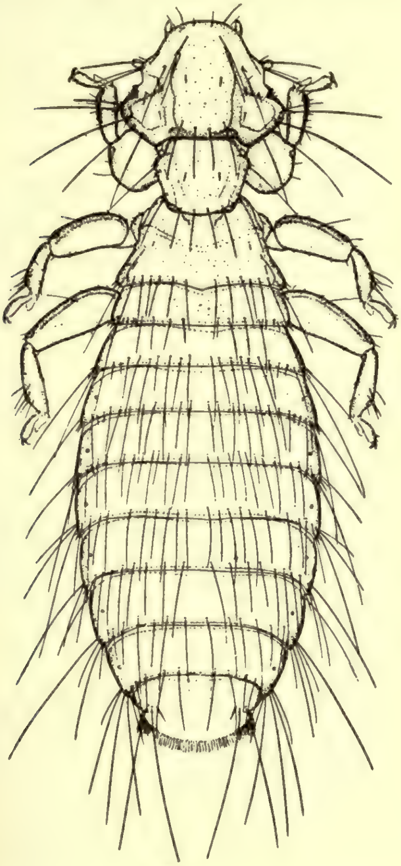

FIG. 62

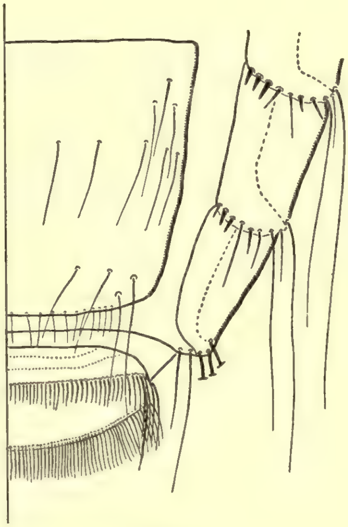

FIG. 63

FIG. 62. *Dennyus hirundinis* (Linn.): female.
FIG. 63. *Dennyus hirundinis* (Linn.): terminal segments of ♀ abdomen, ventral.

The portion of the work which deals with Mallophaga is divided into two parts, the first part containing species known to Geoffroy which he describes rather carefully, and the second part containing a list of species unknown to him, most of which are arranged in couplets such as:

1. Pediculus accipitris abdomine oblongo.
2. Pediculus accipitris abdomine ovato.

All of these latter are accompanied by references, mostly to Redi's plates, but fortunately they appear never to have been published in valid form. We do not propose to mention them further, but we think that as so many of the phrases in the first part of the work have been considered to be names and attributed to Geoffroy it may be useful to give brief notes on them.

Pediculus circi, fuscus oblongus . . . (p. 598, pl. 29, fig. 1)

Both the description and the figure are obviously of a *Laemobothrion* and have never been mistaken for any other genus. The host is given as 'Busard des marais, *circus* Bellon.'

The 'name' was first published in valid form by Fourcroy (1785), and will be dealt with later.

Pediculus subflavescens; abdomine ovato . . . (p. 599)

An obvious *Philopterus*, stated to be from '*moineau franc*' i.e. *Passer domesticus* (Linn.). Not shortened to valid form until after Fourcroy (1785: 518) had named the species *Pediculus passeris*, but in order to settle the confusion which has arisen over the name for the *Philopterus* of *Passer domesticus* we intend in a later part to erect neotypes of the *Philopterus* from this host for *Pediculus fringillae* Scopoli (1772: 125) which was described without a host.

Pediculus oblongus, filiformis albicans . . . (p. 599)

There is a reference to pl. 2, fig. 1, of the Latin version of Redi and the description agrees well with this figure, which is *Columbicola columbae* (Linn.). It is important to note that this phrase, not being a name, does not invalidate *Pediculus oblongus* Scopoli, 1763. We have not been able to find any later use of the 'name', but in any case it would be a synonym of *Columbicola columbae* (Linn.), which is based on the same figure of Redi's plate, and would be preoccupied by *P. oblongus* Scopoli.

Pediculus albo nigroque varius . . . (p. 600)

So obviously not a name that no attempt has ever been made to use it.

Pediculus galli-pavonis (p. 600)

But for the general character of the work and Geoffroy's introductory remarks, mentioned above, this would undoubtedly be taken for a valid name. Geoffroy's description and his reference to '*Linn. faun. suec. n.* 1160. *Pediculus meleagridis*' show perfectly clearly that his species (from 'dindon', i.e. *Meleagris gallopavo domestica*) was *Chelopistes meleagridis* (Linn.), and we cannot understand why Harrison (1916), having correctly taken this view on p. 15, quoted '*Lipeurus gallipavonis* Geoffroy' as a valid species on p. 83 with *polytrapezius* as a synonym. The only effect of this is to make *Lipeurus gallipavonis* Harrison 1916 a synonym of *Oxylipeurus p. polytrapezius* (Burmeister). Geoffroy's description is merely a translation of that of Linné.

The last two descriptive phrases form a couplet and can be dealt with together. They are '*Pediculus gallinae, abdomine margine nigro*' and '*Pediculus gallinae, thorace capiteque utrinque mucronato*' (p. 601). They are Nos. 1165 and 1166 of *Fauna Suecica* respectively, and have already been dealt with as *Lipeurus caponis* (Linn.) and *Menopon gallinae* (Linn.).

LIST OF SPECIES

The synonymy of the following names has been established:*

Specific name	*Present status*	*Page*
acanthus Giebel.	*Saemundssonia haematopi* (Linn.).	259
anseris Linn.	*Anaticola anseris* (Linn.).	239
ardeae Linn.	*Ardeicola ardeae* (Linn.).	247
baculus Nitzsch.	*Columbicola columbae* (Linn.).	264
bovis Linn.	*Damalinia bovis* (Linn.).	227
burmeisteri Denny.	*Dennyus hirundinis* (Linn.).	267
caponis Linn.	*Lipeurus caponis* (Linn.).	262
charadrii Linn.	*Quadraceps charadrii* (Linn.).	253
ciconiae Linn.	*Ardeicola ciconiae* (Linn.).	252
columbae Linn.	*Columbicola columbae* (Linn.).	264
corvi Linn.	*Philopterus corvi* (Linn.).	231
cygni Linn.	*Ornithobius cygni* (Linn.).	235
cygnorum Vollenhoven.	*Ornithobius cygni* (Linn.).	235
ebraeus Nitzsch.	*Esthiopterum gruis* (Linn.).	249
eurysternum Denny.	*Myrsidea picae* (Linn.).	233
falcicornis Nitzsch.	*Goniodes pavonis* (Linn.).	261
fulicae Linn.	*Incidifrons fulicae* (Linn.).	255
gallinae Linn.	*Menopon gallinae* (Linn.).	262
gallipavonis Harrison.	*Oxylipeurus polytrapezius* (Burmeister).	271
glaucus Stephens.	*Saemundssonia haematopi* (Linn.).	259
gruis Linn.	*Esthiopterum gruis* (Linn.).	248
haematopi Linn.	*Saemundssonia haematopi* (Linn.).	259
haematopodis Gmelin.	*Saemundssonia haematopi* (Linn.).	259
hasticeps von Olfers.	*Laemobothrion tinnunculi* (Linn.).	228
hastipes Burmeister.	*Laemobothrion tinnunculi* (Linn.).	228
hebraeus Giebel.	*Esthiopterum gruis* (Linn.).	249
heterocerus Nitzsch.	*Goniodes tetraonis* (Linn.).	266
hirundinis Linn.	*Dennyus hirundinis* (Linn.	267
jejunus Nitzsch.	*Anaticola anseris* (Linn.).	239
lagopi Linn.	*Goniodes lagopi* (Linn.).	264
lagopodis Gmelin.	*Goniodes lagopi* (Linn.).	264
leucopygus Burmeister.	*Ardeicola ardeae* (Linn.).	247
meleagridis Linn.	*Chelopistes meleagridis* (Linn.).	261
moschatae Linn.	*Acidoproctus moschatae* (Linn.).	239
obtusus Stephens.	*Ardeicola ardeae* (Linn.).	247
pallidum Nitzsch.	*Menopon gallinae* (Linn.).	262
pavonis Linn.	*Goniodes pavonis* (Linn.).	261

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* *Nomina nuda*, phrases that are not names, and names that refer to species other than Mallophaga are omitted.

Specific name	*Present status*	*Page*
pertusus Burmeister.	*Incidifrons fulicae* (Linn.).	257
picae Linn.	*Myrsidea picae* (Linn.).	233
pileus Nitzsch.	*Quadraceps recurvirostrae* (Linn.).	258
plataleae Linn.	*Ardeicola plataleae* (Linn.).	245
platalearum Giebel.	*Ardeicola plataleae* (Linn.).	245
pulicare Denny.	*Dennyus hirundinis* (Linn.).	267
punctatum Rudow.	*Ornithobius cygni* (Linn.).	236
querquedulae Linn.	*Trinoton querquedulae* (Linn.).	243
recurvirostrae Linn.	*Quadraceps recurvirostrae* (Linn.).	258
scalaris Nitzsch.	*Damalinia bovis* (Linn.).	227
semisignatus Denny.	*Philopterus corvi* (Linn.).	231
stenopygos Giebel.	*Acidoproctus moschatae* (Linn.).	240
stenopyx Burmeister.	*Acidoproctus moschatae* (Linn.).	240
sternae Linn.	*Saemundssonia sternae* (Linn.).	245
stylifer Nitzsch.	*Chelopistes meleagridis* (Linn.).	262
styliferum Taschenberg.	*Chelopistes meleagridis* (Linn.).	262
tauri Linn.	*Damalinia bovis* (Linn.).	266
tesselatus Denny.	*Lipeurus caponis* (Linn.).	263
tetraonis Linn.	*Goniodes tetraonis* (Linn.).	266
tibialis Piaget.	*Dennyus hirundinis* (Linn.).	267
tinnunculi Linn.	*Laemobothrion tinnunculi* (Linn.).	228
truncatus von Olfers.	*Dennyus hirundinis* (Linn.).	267
variabilis Burmeister.	*Lipeurus caponis* (Linn.).	263
versicolor Nitzsch.	*Ardeicola ciconiae* (Linn.).	252

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PLATE 1

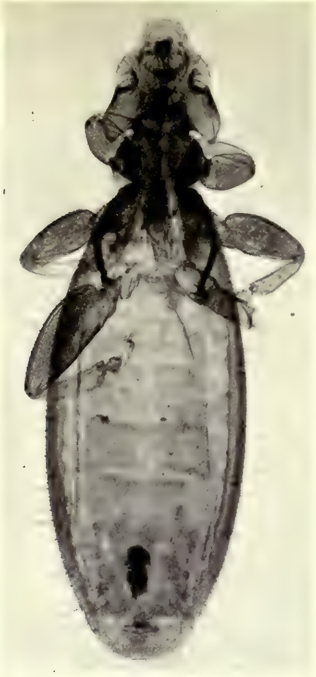
Fig. 1. *Laemobothrion tinnunculi* (Linn.) ♀

Fig. 2. *Philopterus corvi* (Linn.) ♂

Fig. 3. *Acidoproctus moschatae* (Linn.) ♂

Fig. 4. *Acidoproctus moschatae* (Linn.) ♀

Fig. 5. *Ardeicola plataleae* (Linn.) ♀



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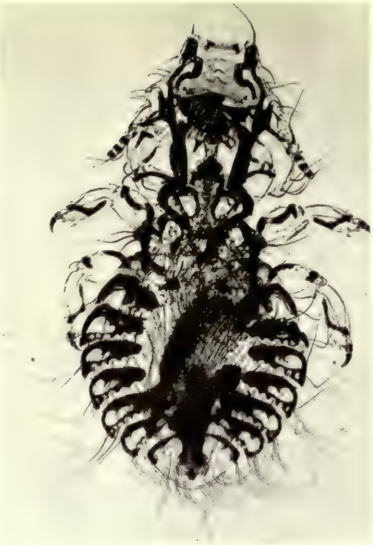

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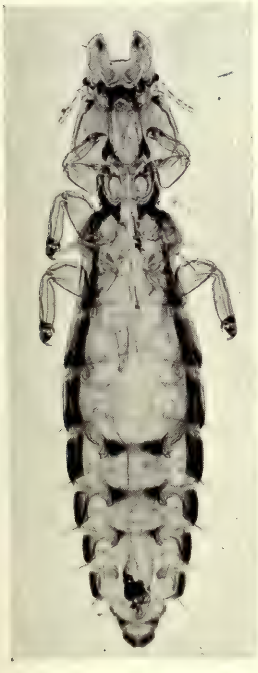

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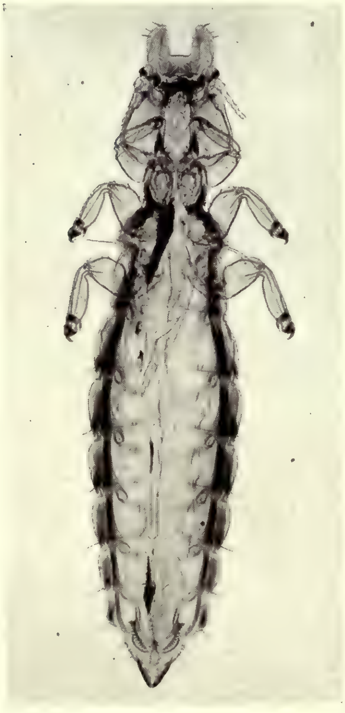

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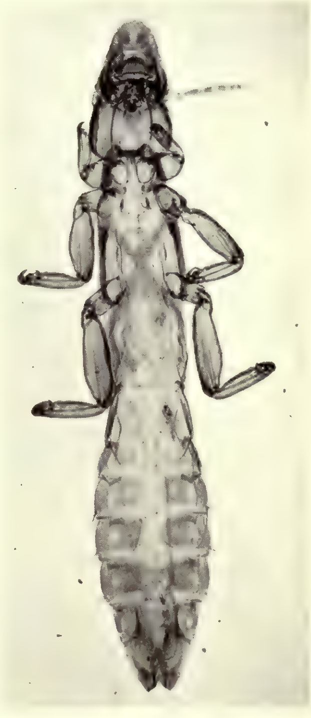

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PLATE 2

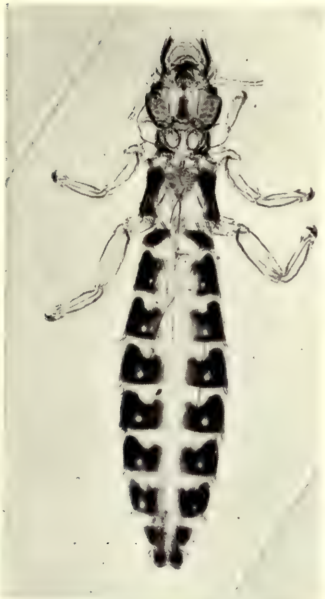
FIG. 1. *Anaticola anseris* (Linn.) ♀

FIG. 2. *Trinoton querquedulae* (Linn.) ♂

FIG. 3. *Ardeicola ciconiae* (Linn.) ♂

FIG. 4. *Ardeicola ciconiae* (Linn.) ♀

FIG. 5. *Quadraceps charadrii* (Linn.) ♀



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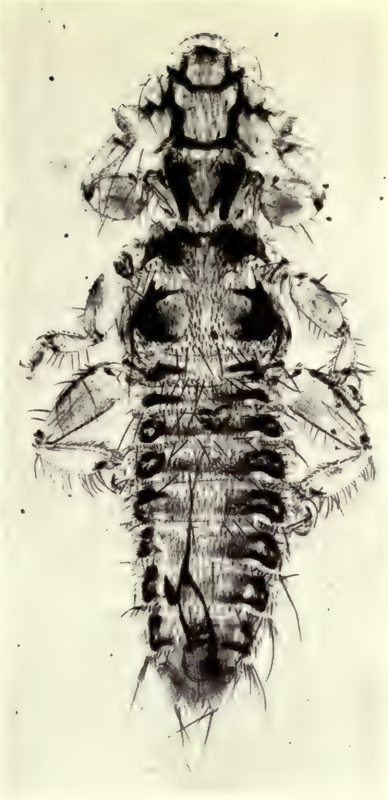

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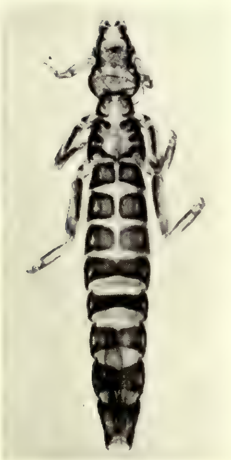

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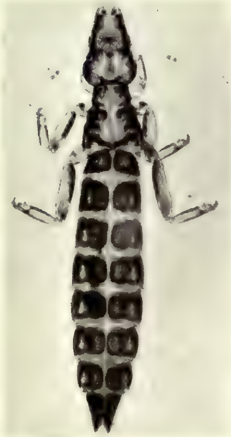

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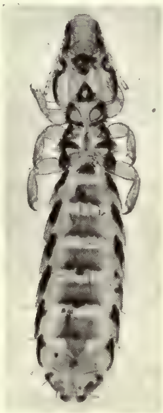

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THE TYPE SPECIMENS OF CERTAIN ORIENTAL EUCOSMIDAE AND CARPOSINIDAE

(MICROLEPIDOPTERA)

DESCRIBED BY EDWARD MEYRICK
TOGETHER WITH DESCRIPTIONS OF NEW
EUCOSMIDAE AND CARPOSINIDAE IN THE
BRITISH MUSEUM (NATURAL HISTORY)

A. DIAKONOFF

BULLETIN OF
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ENTOMOLOGY Vol. 1 No. 4
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BY
A. DIAKONOFF
Zoological Museum, Buitenzorg,
Java

BRITISH MUSEUM NATURAL HISTORY

Pp. 273–300; Pls. 3–8; 2 Text-figures

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ENTOMOLOGY Vol. 1 No. 4
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THE BULLETIN OF THE BRITISH MUSEUM (NATURAL HISTORY), *instituted in 1949, is to be issued in five series, corresponding to the Departments of the Museum.*

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THE TYPE SPECIMENS OF CERTAIN ORIENTAL EUCOSMIDAE AND CARPOSINIDAE

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DESCRIBED BY EDWARD MEYRICK, TOGETHER WITH DESCRIPTIONS OF NEW EUCOSMIDAE AND CARPOSINIDAE IN THE BRITISH MUSEUM (NATURAL HISTORY)

By A. DIAKONOFF

THE current classification of the South Asiatic Microlepidoptera is due almost entirely to Edward Meyrick. Several families were recognized by him, and many genera and more than a thousand species from this region were described by him. These descriptions were based on material which was chiefly preserved in his own collection which is now in the British Museum (Natural History). To save space Meyrick used double-sided store boxes to house his collection, and arranged his specimens in vertical rows, very close to each other, sometimes 'shingled', above the specific name-label. All his specimens are mounted on short pins and have very small, uniform, sometimes printed, but mostly hand-written locality and date labels. Meyrick remounted every specimen mounted otherwise than on these short pins and re-labelled them with his own small labels, written in a uniform way, thus: locality, name of the country, collector's name (in capitals), and date.

A great difficulty which Meyrick created for posterity is due to the fact that he never fixed the types of his own species, except in very few instances; further, it is evident now that, however clear his conception of the genera may have been, he had a rather poor eye for specific differences during the later years of his life. Consequently, quite heterogeneous series sometimes occur under a single specific name. This, together with the fact that his descriptions were short, hardly ever illustrated, and ignored the characters of the genitalia, makes recognition of Meyrick's species sometimes difficult.

During a seven-weeks' visit to the British Museum (Natural History) in 1946 the author, who is studying the Microlepidoptera of the Indo-Malayan and Papuan regions, had to face this problem. Mr. W. H. T. Tams, of the Department of Entomology, suggested to him that he should undertake the fixation of lectotypes in Meyrick's collection. The author consented eagerly to this proposition, but as his time was very limited, he was only able to discharge a very small part of this immense task.

The present paper records the results of this work, grouped under four headings, namely, (1) Asiatic Eucosmidae other than *Bactra* and *Lobesia*; (2) Asiatic and Papuan *Bactra* and *Lobesia*; (3) Asiatic and Papuan CARPOSINIDAE having direct relation to the Meyrick collection, and (4) certain other Asiatic and Papuan CARPOSINIDAE in the British Museum (Natural History).

For simplicity of reference the species are arranged alphabetically under their trivial names within each genus. Where new synonymy occurs the later name is placed immediately after the one of which it is considered a synonym and a cross reference is arranged alphabetically.

Species described from single specimens are recorded as 'holotypes'; when a single male and a single female served for the description they are recorded as 'holotype' and 'allotype'; when Meyrick himself fixed a type, this specimen is recorded as 'type' only. For all the other species the author has fixed a lectotype, as far as possible a male, and, in the family EUCOSMIDAE, where he could do so, a paralectotype of the opposite sex was also fixed. These specimens are recorded as 'lectotype' and 'paralectotype'. This was done in order to make it easier for later workers to study the genitalia of both sexes. In doing so the author has taken the greatest care to compare the original descriptions with the specimens and labels, and special remarks are made in every difficult case. For every species the total number of males and females present in the collection is recorded, the excess (if any) over the original type material being due to specimens added by Meyrick. As it was not always easy to determine the sex of specimens which had lost their bodies, such specimens are recorded as 'without abdomen'. All specimens which, in the author's opinion, had been erroneously identified by Meyrick, are marked with the present author's own determination-labels bearing what he considers to be their correct names.

Through lack of time the study of the genitalia had to be restricted to species of two difficult genera, *Lobesia* and *Bactra*. No definite conclusions could be reached at the time concerning the apparent synonymy of a number of species, of which the genitalia could not then be studied.

The author is greatly obliged to Mr. W. H. T. Tams, of the British Museum (Natural History), who never tired of answering numberless questions and was always ready with kind help and suggestions. Mr. Tams kindly helped the author with the mounting of the genitalia, which he also photographed. He has also read the proofs of this paper. Furthermore, the author is greatly obliged to Dr. T. H. C. Taylor, of the Commonwealth Institute of Entomology, for his kind suggestions and information on nomenclature.

1. ASIATIC EUCOSMIDAE OTHER THAN *BACTRA* AND *LOBESIA*

Genus ACROCLITA Lederer, 1859

Wien. Ent. Monatschr. **3:** 329

Acroclita argyrophenga sp. nov.

ἀργυρο-φεγγής = silver-shining

♂ 13–14 mm. Face and palpi ochreous-whitish, vertex of head and thorax pale ochreous, suffused with brownish. Abdomen ochreous-greyish. Fore wing elongate, moderately broad, with costa curved from base to ¾, almost straight beyond this, apex acute, projecting, termen strongly excavate below apex, sinuate, tornus rounded, rather oblique; dull ochreous-greenish darker towards apex, an ill-defined broad transverse band at ⅖, little outwardly oblique, separating basal area which is sometimes clouded with brownish; about 11 pairs of transverse streaks on costa, light with silvery gloss, especially distinct along apical ⅖, costa narrowly dark brown between these, an ill-defined U-shaped area of scales with silvery gloss before tornus, its posterior arm before termen reaching almost to apex, its opening bearing a pair of narrow short longitudinal streaks and a few points below them jet-black. Some brownish suffusion in tornus before silvery area. Cilia brownish tinged greenish, with light basal line, their tips on apex blackish. Hind wing glossy whitish-ochreous or brownish-ochreous, tinged darker at apex. Cilia brownish-ochreous with a pale basal line.

ASSAM, Khasi Hills, 'D', .6.06. 2 specimens. (Type in the British Museum.) Perhaps allied to *belinda* Meyrick.

anachastopa Meyrick, 1934, *Exot. Micr.* **4:** 483 (*Acroclita*).
Lectotype ♂, paralectotype ♀: 'Telawa, Java, K., bred .8.33'. 1 ♂, 3 ♀.

belinda Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 858 (*Acroclita*).
Lectotype ♀: 'Khasi Hills, Assam, .8.1906'. 1 ♂, dated .7.06, is not recorded in the description. 3 specimens.

cameraria Meyrick: see *madens* Meyrick (**syn. nov.**).

canthonias Meyrick, 1920, *Exot. Micr.* **2:** 343 (*Acroclita*).
Holotype ♂: 'Pusa, Bengal, T. B. F., 9.11.17' (without abdomen). Other specimens from the same locality dated '6.12.15' and '2.3.29', and from 'Pusa, Bihar, T. B. F., bred 3.23'. 2 ♂, 3 ♀.

catharotorna Meyrick, 1935, in Caradja and Meyrick, *Mater. Chin. Prov.*: 53 (*Acroclita*).
Lectotype ♂: 'Tien-Mu-Shan, China, H., 5300, .4.32' (without abdomen). 1 specimen.

cheradota Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 856 (*Acroclita*).
Holotype ♂: 'Puttalam, Ceylon, Pole, .3.04'. Allotype ♀: 'Pusa, Bengal, H. M. L., bred .4.07', both damaged and without abdomen. Other specimens from 'Dehra Dun, India, R. N. M., bred 4.32, 8.33'. 4 ♂, 2 ♀.

chlorissa Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 859 (*Acroclita*).
Lectotype ♂, paralectotype ♀: 'Khasi Hills, Assam, .10.1906'. 2 ♂, 1 ♀. The second male is without abdomen and of doubtful affinity.

clivosa Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 855 (*Acroclita*).
Lectotype ♂: 'Khasi Hills, .10.1906'. 2 ♂.

cordelia Meyrick, 1935, in Caradja and Meyrick, *Mater. Chin. Prov.*: 52 (*Acroclita*).
Holotype ♀: 'Shanghai, China, C., .8.32'. Described as a male by Meyrick, but found to be a female.

corinthia Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 858 (*Acroclita*).
Lectotype ♂: 'Maskeliya, Ceylon, Pole, .5.1906'. Paralectotype ♀: 'Maskeliya, Ceylon, Green, .11.1906'. 3 other specimens without abdomen from the same locality (Alston, Pole), dated .05, .06, and 10.11.12.

dejiciens Meyrick, 1932, *Exot. Micr.* **4:** 221 (*Acroclita*).
Holotype ♀: 'Seneng, Java, K., 7.36'.

Syn. nov. *spilocausta* Meyrick, 1934, *Exot. Micr.* **4:** 484 (*Acroclita*).
Lectotype ♂: 'Telawa, Java, K., bred .3.33'. 2 ♂.

eclipticodes Meyrick, 1935, in Caradja and Meyrick, *Mater. Chin. Prov.*: 52 (*Acroclita*).
Holotype ♀: 'Tien-Mu-Shan, China, C., 5000, 4.32'.

esmeralda Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 858 (*Acroclita*).
Holotype ♂, allotype ♀: 'Khasi Hills, Assam, .10.1906'.

euphylla Meyrick, 1926, *J. Sarawak Mus.* **3:** 150 (*Acroclita*).
Lectotype ♀: 'Mt. Murud, Borneo, 2300, 2.10.22'.

grypodes Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 856 (*Acroclita*).
Holotype ♂: 'Maskeliya, Ceylon, Pole, .5.06'.

Syn. nov. *vulturina* Meyrick, 1936, *Exot. Micr.* **4:** 610 (*Acroclita*).
Lectotype ♀: 'Mt. Gede, Java, K., bred 12.33'. Doubtlessly conspecific with the foregoing. 1 specimen.

hercoptila Meyrick, 1927, *Exot. Micr.* **3:** 333 (*Acroclita*).
Holotype ♂: 'Sumatra, F., bred .8.25'.

iridorphna Meyrick, 1936, *Exot. Micr.* **4:** 609 (*Acroclita*).
Holotype ♂, allotype ♀: 'Taihoku, Formosa, S. I., 17.11.32'.

Acroclita falcigera sp. nov.

♀ 16–17 mm. Head and palpi light ochreous, thorax light ochreous, slightly suffused with brownish, abdomen ochreous-brownish with bronze gloss, dark brownish-grey towards apex. Fore wing rather broad, ovate, costa gradually curved throughout, apex protruded, termen strongly sinuate above, rounded beneath, tornus broadly rounded, tawny-ochreous, with a series of dark brown costal marks and small dots along dorsum, a blackish-brown cloudy more or less continuous sickle-shaped mark, concave above, running from middle of costa to beyond $\frac{3}{4}$ of disk below costa, from there straight to apex and across this over the apical cilia (this being the handle of the sickle); some brownish indistinct suffusion along its under side, running obliquely to the middle of dorsum, sharply edged with darker below the fold; a few indistinct and narrow transverse inwardly oblique strigulae between this and base reaching just beyond fold; a minute, dark brown strigula along termen. Cilia brownish-grey with whitish base, dark brown on apex. Hind wing brownish-grey, cilia lighter with an ochreous-whitish basal line.

CEYLON, Kegalle, 'G. C. A.', 'I. P.', .04, .08, .09; N. COORG, Dibidi, 'L. N.', 4.1.09. 4 specimens. (Type in the British Museum.) Very near to *Acroclita spiladorma* Meyrick from Java, but much larger, with dark mark sickle-shaped instead of elongate-semiovate.

ligyropis Meyrick: see *Spilonota aestuosa* Meyrick (**syn. nov.**).

Acroclita lithoxoa sp. nov.

λιθο-ξόος = stone polishing

♂ 7·5 mm., ♀ 11 mm. Head and palpi dark greyish-brown, face, terminal joint, and tip of median joint of the palpi snow-white in ♂, brownish-greyish in ♀. Thorax ochreous-brownish, somewhat suffused with dark brown. Abdomen ochreous-greyish, darker towards apex. Fore wing narrow, elongate, in ♂ with costa slightly curved at base, straight posteriorly, apex rounded, termen straight, little oblique; in ♀ fore wing somewhat narrowed posteriorly, costa slightly curved throughout; ground-colour greyish-whitish, slightly scattered with darker, markings greyish-brown to blackish-brown: basal area with outer edge distinct, running from ⅖ of costa to ⅓ of dorsum, slightly convex, a little serrate, emarginate below costa; a strongly concave dark transverse fascia in middle of basal area; transverse fascia a narrow streak on middle of costa, strongly dilated below this, its outer edge serrate, rather distinct, in ♂ with a blackish tooth in middle of disk, in both sexes dark brown on dorsum, its outer edge indefinite; a small cloudy costal patch before apex; apex dark brown, edged by a minute white semicircular streak, a straight dark brown fascia along termen, separated from apex by a white dot, not reaching dorsum. Cilia brownish-grey, around apex dark blackish-brown, with a whitish streak below apex, a pale basal and a pale median line in ♀, a light basal line and median suffusion of white scales in ♂. Hind wing rather narrow, trapezoidal, brownish-grey, veins darker. Cilia greyish, with a pale basal line in ♂, greyish with apical half white in ♀.

INDIA. Bengal, Pusa, bred .4.16 'T. B. F.'; N. COORG, Dibidi, 31.5.06 Newcome, 1 ♂, 1 ♀. Allied to *Acroclita hercoptila* Meyrick.

loxoplecta Meyrick, 1935, in Caradja and Meyrick, *Mater. Chin. Prov.*: 53 (*Acroclita*).
Lectotype ♂: 'Tien-Mu-Shan, China, C., 5000, .4.32'. 1 specimen.

madens Meyrick, 1921, *Zoöl. Meded.* **6:** 153 (*Acroclita*).
Two ♀ specimens placed by Meyrick under this name, when compared with type from the Leiden Museum turn out to belong to a new species.

Syn. nov. *cameraria* Meyrick, 1932, *Exot. Micr.* **4:** 221 (*Acroclita*).
Lectotype ♀: 'Seneng, Java, K., .8.31'. Other specimens from the same locality, 'K. 8.31, .1.33, bred .1.35'. 4 ♀.

melanomochla Meyrick, 1936, *Exot. Micr.* **5:** 24 (*Acroclita*).
Lectotype ♂: 'Heito, Formosa, S. I., bred 4.35'. Paralectotype ♀: 'Taihoku, Formosa, S. I., bred 5.35'. 1 ♂, 3 ♀.

microrrhyncha Meyrick: see *naevana* Hübner (**syn. nov.**).

multiplex Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 860 (*Acroclita*).
Lectotype ♀: 'Opiya, Ceylon, E. E. G., .11.07'. 2 ♀.

naevana Hübner, 1825, *Verz. bek. Schmett.* 382 (*Eudemis*).
Assam, Cherapunji, T. B. F., .18; Khasi Hills, 5.6.1906 and 1907. N. Coorg, Dibidi, Newcome, 23–27.6.06. Ceylon, Haputala, G. C. A., .11.08; Maskeliya, 5–12.06. China, Tien-Mu-Shan, C., 5,000, .10.32. 16 specimens, 7 ♂, 5 ♀; others without abdomen. A rather heterogeneous-looking series, but in all probability conspecific.

Associated with these specimens was a ♂ from Barberija Is., Ceylon, B. F., 22.2.07, not named by Meyrick, which is a ♂ of *Acroclita spiladorma* Meyrick.

Syn. nov. *microrrhyncha* Meyrick, 1931, *Exot. Micr.* **4:** 127 (*Acroclita*).
Holotype ♀: 'Parachinar, India, M., bred .7.17'.

neaera Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 859 (*Acroclita*).
Holotype ♂, allotype ♀: 'Maskeliya, Ceylon, Pole, .5.1906'.

notophthalma Meyrick, 1933, *Exot. Micr.* **4:** 417 (*Acroclita*).
Lectotype ♂: 'Dehra Dun, India, C., bred .1.36', paralectotype ♀: 'Dehra Dun, India, C., bred .11.32'. Other specimens in .11.32 and .11.35 and also from Nilambar, Madras, C. B., bred .5.33. 4 ♂, 3 ♀.

paulina Meyrick, 1925, *Exot. Micr.* **3:** 140 (*Acroclita*).
Holotype ♀: 'Muktesar, Kumaon, T. B. F., 7000, .4.23'.

physalodes Meyrick, 1910, *Trans. Ent. Soc. Lond.* 1910: 368 (*Rhopobota*).
Lectotype ♂: 'I. du Coin, Chagos Is., T. B. F., 25.6.05'. Paralectotype ♀: 'Galle, Ceylon, B. F., 18.4.07'. 2 ♂, 1 ♀.

prasinissa Meyrick, 1921, *Zoöl. Meded.* **6:** 152 (*Acroclita*).
'Preangor, Java, L. M., 5,000, .21'. 1 ♀. Type in Leiden Museum.

pythonias Meyrick, 1910, *Trans. Ent. Soc. Lond.* 1910: 434 (*Rhopobota*).
Holotype ♂: 'Bandong, Java, .07'.

scatebrosa Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 861 (*Ancylis*).
Lectotype ♀: 'Khasi Hills, Assam, .6.1906'. 2 ♀ and 1 specimen without abdomen. Also 1 ♀ specimen from 'Nilgiri Hills, H. L. Andrews, 7000 ft., Pykara, III.13' which is a quite distinct species.

scleropa Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 857 (*Acroclita*).
Lectotype ♂, paralectotype ♀: 'Namunukuli, Ceylon, E. E. G., .2.10'. Also specimens from Ootacamund, S. India, T. B. F., 7400, .1.13. 2 ♂, 3 ♀.

spiladorma Meyrick, 1932, *Exot. Micr.* **4:** 221 (*Acroclita*).
Holotype ♀: 'Java, L. G. K., bred 12.30'. Other specimens from Seneng, Java, K., bred .3.32. 1 ♂, 2 ♀. Another ♀ specimen from the same locality, bred .12.31, must be transferred to *dejiciens* Meyrick.

spilocausta Meyrick: see *dejiciens* Meyrick (**syn. nov.**).

symbolias Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 857 (*Acroclita*).
Lectotype ♂: 'Khasi Hills, India, .10.06'. Paralectotype ♀: 'Khasi Hills, India, .8.06'. Also from Shillong, Assam, T. B. F., .8.9.27. 2 ♂, 1 ♀.

thysanota Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 860 (*Acroclita*).
Lectotype ♂: 'Khasi Hills, Assam, .11.1906'. Another specimen from the same locality D., .06; 1 ♀, much darker, but apparently conspecific, from Shillong, Assam, T. B. F., .22. 2 ♂, 1 ♀.

trachynota Meyrick, 1926, *J. Sarawak Mus.* **3:** 150 (*Acroclita*).
Holotype ♀: 'Mt. Murud, N. Borneo, 3500, 3.11.22'.

trimelaena Meyrick, 1922, *Exot. Micr.* **2:** 521 (*Acroclita*).
Holotype ♂: 'Thaton, Burma, T. B. F., .3.18'.

vigescens Meyrick, 1920, *Exot. Micr.* **2:** 343 (*Acroclita*).
Lectotype ♂: 'Bardoli, Surat, R. M., bred 5.19'. Paralectotype ♀: 'Pusa, Bengal, T. B. F., bred .3.16' (without doubt belongs to the same species). Also from

the latter locality dated .4.16 and .10.19. 2 ♂, 2 ♀; of these one worn ♂ specimen does not belong here, the other ♂ specimen belongs to *lithoxoa* nov. spec. 3 ♂, 3 ♀.

vulturina Meyrick: see *grypodes* Meyrick (**syn. nov.**).

Genus Ancylis Hübner, 1825

Verz. bek. Schmett.: 376

ancorata Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 862 (*Ancylis*).
Lectotype ♀: 'Kegalle, Ceylon, G. C. A., .09'. Other specimens from Konkan, Bombay, L. C. Y., .05. 3 ♀.

anthracaspis Meyrick, 1931, in Caradja, *Bull. Acad. Roum.* **14:** 6 (*Ancylis*).
Lectotype ♂: 'Kwanshien, China, F., .7.28'. 2 ♂.

aromatias Meyrick, 1912, *Exot. Micr.* **1:** 31 (*Ancylis*).
Lectotype ♂: 'Dibidi, N. Coorg, Newcome, 11.11.06'. A printed label; still this specimen must be one of the type lot: Meyrick cites the locality as: 'Madras, N. Coorg, 3500 feet, in November and February (Newcome), 2 specimens'. Other specimens from Dehra Dun, India, C., bred .5.32. 'Cho ganh, Tonkin, J., .9.14'. 2 ♂, 1 ♀. Probably *cyanostoma* Meyrick is a synonym of this.

celerata Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 863 (*Eucosma*).
Lectotype ♂: 'Dibidi, N. Coorg, Newcome, 10.12.06. Also, in January, April, May and December .06, .07, .11, .12 and .24.' 5 ♂, 2 ♀.

cyanostoma Meyrick, 1916, *Exot. Micr.* **2:** 16 (*Ancylis*).
Lectotype ♀: 'Pusa, Bengal, T. B. F., bred 31.1.16'. Other specimens from: 'Calcutta, Bengal, D. T. K., .58' and 'Telawa, Java, K., .7.32'. 3 ♂, 3 ♀. This is very probably a synonym of *aromatias* Meyrick.

glycyphaga Meyrick, 1912, *Exot. Micr.* **1:** 32 (*Ancylis*).
Lectotype ♀: 'Pusa, Bengal, 13.1.10'. Other specimens from Dharwar, Kanara, R. M., bred .2.16; Khasi Hills, Assam. 2 ♂, 3 ♀. (1 ♂, 1 ♀ without abdomen.) Also 1 specimen from Gifu, Japan, N., 15.7.25, must be transferred to *cyanostoma* Meyrick.

hemicatharta Meyrick, 1935, in Caradja and Meyrick, *Mater. Chin. Prov.*: 54 (*Ancylis*).
Holotype ♂: 'Tien-Mu-Shan, China, C., 5000, .6.32'.

hygroberylla Meyrick, 1937, *Iris* **51:** 180 (*Eucosma*).
Likiang, China, 13,300–16,500, H., 13.8.35. 2 ♂, 5 ♀. Type in coll. Caradja.

hylaea Meyrick, 1912, *Exot. Micr.* **1:** 31 (*Ancylis*).
Lectotype ♂: 'Khasi Hills, Assam, .11.1907'. Paralectotype ♀: 'Khasi Hills, Assam, 1906'. 3 ♂, 1 ♀. Also 1 specimen without abdomen.

lutescens Meyrick, 1912, *Exot. Micr.* **1:** 32 (*Ancylis*).
Lectotype ♂: 'Pusa, Bengal, T. B. F., 19.10.07'. Paralectotype ♀: 'Pusa, Bengal, T. B. F. 29.4.08'. Others from 'Nagpur, India, T. B. F., .10.07, on groundnut' and from 'Taishan, China, H., 5000, .5.32'. 4 ♂, 11 ♀. 1 ♂ and 1 ♀ specimen from 'Pusa, Bengal, T. B. F., 19.10.07' must be transferred to *glycyphaga* Meyrick.

microphthora Meyrick, 1936, *Exot. Micr.* **4:** 609 (*Ancylis*).

Lectotype ♀: 'Telawa, Java, L. G. K., bred 4.34'. 2 specimens.

percnobathra Meyrick, 1933, *Exot. Micr.* **4:** 417 (*Ancylis*).

Sumatra, 2,500, N., bred .31. 1 ♂. Type in General Collection in the British Museum.

rostrifera Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 862 (*Ancylis*).

Lectotype ♂: 'Maskeliya, Ceylon, Pole, .1.06'. Also from Madulsima, Ceylon. 4 ♂, 2 ♀.

sculpta Meyrick, 1912, *Exot. Micr.* **1:** 33 (*Ancylis*) = *comptana* Fröl., 1828, *Enum. Tortr. Würt.* no. 242.

Holotype ♂: 'Port Hamilton, S.E. Korea, T. B. F., 15.4.99'. Meyrick gave this synonymy later on in his Catalogue of Tortricina, &c. (in MS.).

thalera Meyrick, 1907, *J. Bomb. Nat. Hist. Soc.* **18:** 142 (*Ancylis*).

Lectotype ♂, paralectotype ♀: 'Khasi Hills, Assam, .6.1906'. 3 ♂, 9 ♀. Also 2 specimens from Likiang, China, H., 13,000, .1.35, which certainly do not belong here.

tumida Meyrick, 1912, *Exot. Micr.* **1:** 30 (*Ancylis*).

Holotype ♂: 'Kandy, Ceylon, Green, .9.07'. Another specimen (♀ without abdomen) from Dibidi, N. Coorg, L. N., 28.8.08. Meyrick himself fixed the ♂ specimen as type.

Genus ANTICHLIDAS Meyrick, 1931

Bull. Acad. Roum. **14:** 7

holocnista Meyrick, 1931, in Caradja, *Bull. Acad. Roum.* **14:** 8 (*Antichlidas*).

Lectotype ♂, paralectotype ♀: 'Kwan Shien, China, F., 7.8.30'. 1 ♂, 3 ♀.

Genus CRUSIMETRA Meyrick, 1912

J. Bomb. Nat. Hist. Soc. **21:** 855

anastrepta Meyrick, 1927, *Ins. Samoa* **3:** 71 (*Crusimetra*).

Paratype ♂: 'Haputala, Ceylon, G. C. A., .2.06'.

verecunda Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 855 (*Crusimetra*).

Lectotype ♂, paralectotype ♀: 'Namunakuli, Ceylon, E. E. G., .2.10'. 3 other specimens with same data, 1 ♂ with abdomen missing. 3 ♂, 2 ♀.

Genus ERINAEA Meyrick, 1907

J. Bomb. Nat. Hist. Soc. **18:** 141

verditer Hampson, 1891, *Ill. Lep. Het.* **8:** 143, pl. 156, f. 25 (*Teras*). Syn. of this is *chlorantha* Meyrick, 1907, *J. Bomb. Nat. Hist. Soc.* **18:** 141 (*Erinaea*).

Namunakuli, Ceylon, E. E. G., .2.10. Maskeliya, Patipola, Pole, de Mowbray, .1.04. Nilgiri Hills, Pylkara (H. L. Andrews), Palni Hills, S. India (Campbell). 5 ♂, 11 ♀.

Genus EUCOENOGENES Meyrick, 1938

Caenogenes Meyrick, nec Walsingham, 1937, *Exot. Micr.* **5:** 159
Eucoenogenes Meyrick, 1938, *Trans. R. Ent. Soc. Lond.* **89:** 49

melanancalis Meyrick, 1937, *Exot. Micr.* **5:** 160 (*Caenogenes*).

Type ♂: 'Dehra Dun, India, R. N. M., bred .5.36'. 1 specimen. In the description of this strange genus Meyrick stated that both vein 8 in fore wing and vein 5 in hind wing are absent. A close examination of the only specimen available, which is worn and damaged, revealed, however, that it is either an abnormal specimen or a degenerate species, as vein 9 in right fore wing is present, but in left wing untraceable, while vein 5 is absent in right hind wing, but present in the left! Otherwise the present genus is congruent with the American *Episimus* Walsingham, of which *E. tyrius* Heinrich has also veins 3 and 4 in hind wing stalked. *Eucoenogenes* Meyrick must be sunk as a **syn. nov.** of *Episimus* Walsingham.

Genus EVETRIA Hübner, 1826

Verz. bek. Schmett.: 378

retiferana Wocke, 1879, *Bresl. ent. Zt.*: 73 (*Retinia*).

Likiang, China, H., .7.34. 1 ♀.

teleopa Meyrick, 1927, *Exot. Micr.* **3:** 333 (*Evetria*).

Canton, China, C., .24. 1 ♂. Perhaps this is the holotype contrary to Meyrick's note at the end of the description: '(Coll. Caradja)'.

Genus GYPSONOMA Meyrick, 1895

Handb. Brit. Lep.: 481

anthracitis Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 863 (*Gypsonoma*).

Holotype ♂ and allotype ♀: 'Maskeliya, Ceylon, de Mowbray, .5.06'. 2 specimens.

riparia Meyrick, 1933, *Exot. Micr.* **4:** 418 (*Gypsonoma*).

Lectotype ♂, paralectotype ♀: 'Multon, Punjab, M., bred .9.28'. 1 ♂, 2 ♀.

Genus HERMENIAS Meyrick, 1911

Proc. Linn. Soc. N.S.W. **36:** 225

implexa Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 852 (*Hermenias*).

Lectotype ♂: 'Namunakuli, Ceylon, E. E. G., .2.10'. Other specimens from the same locality and from Patipola, Ceylon, E. E. G. and G. C. A., .2.10. 9 ♂.

pachnitis Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 852 (*Hermenias*).

Lectotype ♂: 'Maskeliya, Ceylon, Pole, .5.06'. Paralectotype ♀: 'Maskeliya, Ceylon, Alston, .11.06'. 2 ♂, 1 ♀.

palmicola Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 853 (*Hermenias*).

Lectotype ♂: 'Batlicaloa, Ceylon, E. E. G., .5.06'. Paralectotype ♀: 'Puttalam, Ceylon, Pole, .10.04'. Third specimen without abdomen from Trincomali, Ceylon, B. F., .6.07.

Genus HERPYSTIS Meyrick, 1911

Proc. Linn. Soc. N.S.W. **35:** 244

iodryas Meyrick, 1937, *Iris* **51:** 176 (*Herpystis*).
Holotype ♀: 'Likiang, China, H., .6.34'.

jejuna Meyrick, 1916, *Exot. Micr.* **2:** 16 (*Herpystis*).
Lectotype ♂: 'Dibidi, N. Coorg, L. N., .2.13' (abdomen lacking). Paralectotype ♀: 'Dibidi, N. Coorg, L. N., .9.13'. 2 specimens.

pallidula Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 862 (*Herpystis*).
Lectotype: ♂ 'Dibidi, N. Coorg, Newcome, .11.06'. Paralectotype ♀: 'Dibidi, N. Coorg, Newcome, 20.10.06'. 3 ♂, 2 ♀.

tinctoria Meyrick, 1916, *Exot. Micr.* **2:** 16 (*Herpystis*).
Holotype ♂: 'Polibetta, Coorg, T. B. F., .10.15'.

Genus NOTOCELIA Hübner, 1925

Verz. bek. Schmett.: 379

circumfluxana Christoph., 1881, *Bull. Soc. Nat. Moscou.* **1:** 78 (*Aspis*).
'Tien-Mu-Shan, China, C., 5000, .5.32'. 1 ♂.

Genus SPILONOTA Stephens, 1834

Ill. Brit. Ent. (*Haust.*) **4:** 90

aestuosa Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 854 (*Spilonota*).
Lectotype ♂: 'Darjeeling, Bengal, D., .8.08'. 2 ♂.

Syn. nov. *ligyropis* Meyrick, 1937, *Iris* **51:** 176 (*Acroclita*).
Holotype ♀: 'Likiang, China, H., .7.34'. This specimen is conspecific with *Spilonota aestuosa* Meyrick (of which only two were described); vein 7 in fore wing is distinctly separate.

algosa Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 854 (*Spilonota*).
Lectotype ♂, paralectotype ♀: 'Khasi Hills, Assam, .9.1906'. Other material also dated .8.06. 4 ♂, 8 ♀. Also 2 specimens without abdomen.

babylonica Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 854 (*Spilonota*).
Holotype ♂: 'Nilgiri Hills, E. India, H. L. A., 1000, .5.07'.

beryllina Meyrick, 1926, *Treubia* **6:** 428 (*Spilonota*).
Holotype ♂: 'Tjibodas, Java, C., 5000, .8.21'. Worn and faded specimen without abdomen, but still quite distinct.

calceata Meyrick, 1907, *J. Bomb. Nat. Hist. Soc.* **18:** 141 (*Tmetocera*).
Lectotype ♂, paralectotype ♀: 'Khasi Hills, Assam, D., 1906'. 6 ♂, 4 ♀. There are 2 ♀ specimens from: 'Likiang, China, H., 10,000, .8.35', and 'Japan, R., 07' which are *Spilonota prognathana* Snellen and 1 ♀ from 'Likiang, China, H. 13,000, .6.35' which is *Eucosma abathrodes* Meyrick.

chlorotripta Meyrick, 1921, *Zoöl. Meded.* **6:** 151 (*Spilonota*).
'Preanger, Java, S., 5000 ft. 21' (the Type of this species, a female, is in Leiden Museum). 1 ♂, faded and worn, possibly conspecific with 2 ♀ in Leiden Museum.

dissoplaca Meyrick, 1936, *Exot. Micr.* **5:** 23 (*Acroclita*).

Lectotype ♂, paralectotype ♀: 'Telawa, Java, K., bred .7.35'. 2 specimens.

hexametra Meyrick, 1920, *Exot. Micr.* **2:** 342 (*Spilonota*).

Holotype ♀: 'Peshawar, N.W. India, T. B. F., .6.16'.

lechriaspis Meyrick, 1932, *Exot. Micr.* **4:** 306 (*Spilonota*).

Lectotype ♂: 'Kwantung, S. Manchuria, T. K., .6.30'. Paralectotype ♀: 'Kwantung, S. Manchuria, T. K., .7.30'. Other specimens also from Mt. Omei, W. China, 4,000, .8.32. 5 ♂, 2 ♀.

3 ♂ specimens, labelled 'Tien-Mu-Shan, China, C., 5000, .7.32' and 'S. Manchuria, T. K., .24', are *Spilonota calceata* Meyrick.

melanacta Meyrick, 1907, *J. Bomb. Nat. Hist. Soc.* **18:** 140.

Lectotype ♂: 'Khasi Hills, Assam, .6.1903'. 2 ♂, and 1 ♀ which cannot be used as paralectotype as it is labelled 'Khasi Hills, Assam 4.1906', while Meyrick's citation of the date is 'in June 1903'.

melanocopa Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 853 (*Enarmonia*).

Lectotype ♂: 'Khasi Hills, Assam, D., 1906'. Paralectotype ♀: 'Khasi Hills, Assam, 6.1906'. 2 ♂, 3 ♀.

prognathana Snellen, 1883, *Tijdschr. Ent.* **26:** 227, pl. 13, f. 8. *Grapholitha* (*Tmetocera*).

KWANTUNG, S. Manchuria, H. M., .6.30, .7.30. 3 ♀.

rhothia Meyrick, 1910, *Trans. Ent. Soc. Lond.* 1910: 368 (*Spilonota*).

Lectotype ♂: 'Maskeliya, Ceylon, Pole, .3.04'. Other material from Pusa, Bengal, bred on leaves of *Psidium gujava*, in March, April, and December .03, .08 and .09. 6 ♂, 2 ♀. The female was not described and could not be used as paralectotype; the earliest ♀ is dated 25.4.08 and is not of the type lot.

thalassitis Meyrick, 1910, *Trans. Ent. Soc. Lond.* 1910: 434 (*Spilonota*).

Lectotype ♂: 'Bandong, Java, R., .07'. 2 ♂. 'Gunong Ijan, Malay Penins., R., .95'. 1 ♀ (not described). 2 ♂, 1 ♀.

2. ASIATIC AND PAPUAN SPECIES OF THE EUCOSMID GENERA *BACTRA* HÜBNER AND *LOBESIA* STAINTON

Genus BACTRA Stephens, 1834

Ill. Brit. Ent., Haustell. **4:** 124

cerata Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 587 (*Polychrosis*).

Lectotype ♂: 'Diyatalawa, Ceylon, B. F., 19.8.07' (Gen. No. 50). Paralectotype ♀: 'Khasi Hills, Assam, .8.1906' (Gen. No. 51). Other specimens from Ceylon and Shillong, Assam (T. B. F. and R.), .07 and .17. 4 ♂, 4 ♀. In addition 1 ♂ specimen without abdomen.

Genitalia ♂ (Pl. 6, fig. 27): near to *copidotis*. Tegumen narrower, triangular, socii moderate; cucullus long narrow, top rounded, sparsely covered with small bristles; sacculus large, with triangular base and elongate distal part, sparsely bristled throughout with short spines, longer on top; median projection almost as long as cucullus, a short comb of teeth on top; aedoeagus very long, curved, narrowed towards apex, with one tooth at top. Genitalia ♀ (Pl. 8, fig. 39); with 9th segment sclerotized, forming a cordiform plate, ostium moderately wide; colliculum a long curved tube; signum small, scobinate.

commensalis Meyrick: see *copidotis* Meyrick (**syn. nov.**).

copidotis Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 584 (*Bactra*).

Lectotype ♂: 'Gampola, Ceylon, I. P., .10.01' (Gen. No. 47). Paralectotype ♀: 'Puttalam, Ceylon, Pole, .10.04' (Gen. No. 48). Other specimens from Maskeliya, Ceylon, Nilgiri Hills, and Palni Hills, S. India (Andrews, Green, Campbell, Pole), in Feb. and Nov. .03, .06, and .10. 2 ♂, 3 ♀, and 1 specimen without abdomen. 8 specimens.

Genitalia ♂ (Pl. 6, fig. 26): strong and large, tegumen erect-triangular; socii rather large, cucullus elongate, with rounded, densely short-bristled top, a row of sparse, stout bristles along outer edge; sacculus very large, cup-shaped, strong spines along outer edge; median projection as long as cucullus, with a curved pecten of short bristles at top, a few bristles below the top; aedoeagus very long, darkly sclerotized, curved, dentate at top. Genitalia ♀ (Pl. 8, fig. 37); 8th and 9th segments considerably sclerotized, ostium moderate, colliculum strong, anapophyses short; signum small, scobinate.

Syn. nov. *commensalis* Meyrick, 1922, *Exot. Micr.* **2:** 522 (*Bactra*).

Lectotype ♂, paralectotype ♀: 'Pusa, Bengal, T. B. F., bred 6.20' (Gen. ♂ No. 52, ♀ No. 53). Also from Surat, Bombay, H. M. L., 8.7.07. 3 ♂, 1 ♀. The genitalia are the same as those of *copidotis* Meyrick 1909.

Syn. nov. *phenacistis* Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 585 (*Bactra*).

Lectotype ♂: 'Maskeliya, Ceylon, Alston, .4.06' (Gen. No. 25). Paralectotype ♀: 'Khasi Hills, Assam, .9.1906'. 1 ♂ from the same locality, 'de Mowbray, 1.04' (Gen. No. 24), another idem (Alston & Pole) in .3, .5, .11 in 1904 and 1905. 4 ♂, 3 ♀.

Genitalia are identical with those of *B. copidotis* Meyrick 1909, which name has page priority.

Bactra coronata sp. nov.

♂ 12 mm. Light ochreous, with costal marks conspicuously dark brown. A longitudinal horizontal streak in apex and a slightly curved elongate patch in disk brownish. A few small dots and strigulae scattered over the wing.

Genitalia (Pl. 5, fig. 17): very much like the preceding, but with socii more hairy, cucullus somewhat broader, sacculus without apical spines, one row of long, strong bristles around its base.

JAVA, Bandong, L. M., .81 (Gen. No. 33). 1 specimen (Holotype) in B.M. (N.H.).

erasa Meyrick, 1928, *Exot. Micr.* **3:** 442 (*Bactra*).

Lectotype ♀: 'S. Andamans, F., .7.27' (Gen. No. 54). Other specimens also in Aug. 6 ♀.

Genitalia ♀ (Pl. 8, fig. 40): ostium moderate, its rim sclerotized and connected with narrowly sclerotized posterior edge of 8th segment. Signum absent.

furfurana Haworth, 1811, *Lep. Brit.* 466 (*Tortrix*).

Syn. nov. *helophaea* Meyrick, 1928, *Exot. Micr.* **3 :** 442 (*Bactra*).

Lectotype (*helophaea*) ♂: 'Shillong, Assam, 5000 ft. T. B. F., .9.27' (Gen. No. 37). Paralectotype (*helophaea*) ♀: 'Shillong, Assam, 5000 ft., T. B. F., .8.27' (Gen. No. 38). Other specimens from the same locality in .9.20 and from Khasi Hills, Assam, .10.06. 2 ♂, 2 ♀.

Genitalia ♂ (Pl. 5, fig. 21), cf. Pierce, *Gen. Brit. Tortr.* 1922: 40, pl. XIV and Heinrich, *Bull. U.S. Nat. Mus.* **132,** 1926: 83–84, figs. 45, 170, 343. Genitalia ♀: Pl. 7, figs. 32, 35.

geraropa Meyrick: see *truculenta* Meyrick (**syn. nov.**).

graminivora Meyrick, 1922, *Exot. Micr.* **2:** 521 (*Bactra*).

Lectotype ♂, paralectotype ♀: 'Pusa, Bengal, T. B. F., bred 5.20' (Gen. ♂ No. 45, ♀ No. 46). Also a ♂ bred in .6.20 (Gen. No. 44). 4 ♂, 3 ♀. Of these 1 ♂, 2 ♀ from Srinagar, Kashmir, T. B. F., 5,200 ft., .9.23 are apparently not conspecific.

Genitalia ♂ (Pl. 6, fig. 24): very near to *honesta* and *furfurana*, but more strongly sclerotized, cucullus densely bristled throughout along outer margin, sacculus strongly projecting, a larger excavation at top with a thick patch of at least 8 bristles (in *honesta* and *furfurana* 2–3 bristles). Genitalia ♀ (Pl. 7, figs. 34, 36): almost the same as in *furfurana*, anapophyses less sclerotized, 2 rounded sclerotizations on distal edge of 7th segment (absent in *furfurana*). Also the structures of the basal segment are different (cf. Pl. 7, figs. 35, 36).

helophaea Meyrick: see *furfurana* Haworth (**syn. nov.**).

honesta Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 585 (*Bactra*).

Lectotype ♂, paralectotype ♀: 'Khasi Hills, Assam, .9.1906' (Gen. ♂ No. 41, ♀ No. 42). 9 ♂, 4 ♀, and 2 specimens without abdomen.

Genitalia ♂ (Pl. 6, fig. 23): very near to *furfurana* but weakly sclerotized. Tegumen higher, sacculus more projecting, with a curved transverse comb of bristles; aedoeagus very short, cornuti absent. Genitalia ♀ (Pl. 8, fig. 38): no sclerotizations, ostium simple, its dorsal wall somewhat folded; apophyses transparent, little sclerotized, no signa.

leucogama Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 584 (*Bactra*).

Lectotype ♂: 'Puttalam, Ceylon, Pole, .8.04' (Gen. No. 39). Paralectotype ♀: 'Puttalam, Ceylon, Pole, 2.04' (Gen. No. 40). Other specimens from the same locality in .2.04. 2 ♂, 2 ♀. (2 other specimens from Preangar, Java, 5,000, .21, and Anping, Formosa, Sauter, 5 .1917, certainly not conspecific.)

Genitalia ♂ (Pl. 6, fig. 22): tegumen strong, triangular, uncus with a strong projection at top; socii rather large, cucullus elongate, scarcely bristled along the outer edge, top rounded, with hairs and bristles; sacculus quite separate, very broad, sclerotized, cup-shaped, with indent edge, densely covered with short bristles along apex, 2 very strong spines on outer edge, an oblique row of moderate bristles across base; aedoeagus pistol-shaped, darkly sclerotized, with top dentate. Genitalia ♀ (Pl. 7, fig. 33): 8th segment little sclerotized, with top dentate. Genital ostium broad, colliculum strongly sclerotized, short, broad, dilated in middle. Signum scobinate, moderately large.

metriacma Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 583 (*Bactra*).

Lectotype ♂, 'Maskeliya, Ceylon, E. E. G., .8.02' (Gen. No. 36). Paralectotype ♀: 'Maskeliya, Pole, .9.1906' (Gen. No. 66). Another ♂ from the same locality, E. E. G., .8.02 (Gen. No. 65). Other specimens from the same locality, .8 and .9.02–04. 5 ♂, 1 ♀.

Genitalia ♂ (Pl. 5, fig. 19): tegumen moderate, uncus rather long, with dense long bristles on top, socii darkly coloured; narrow, weakly hairy pads. Gnathos absent; cucullus long, narrow, its top rounded and hairy, its outer edge densely covered with short bristles; a transverse row of bristles on base of cucullus and on top of sacculus, a bare area between them; sacculus short, rounded, with a scobinate projection; aedoeagus short, little curved. No cornuti. Genitalia ♀ (Pl. 7, fig. 3): ovipositor lobes elongate, ostium moderate, colliculum narrow, transparent. No sclerotizations.

minima Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 586 (*Bactra*).

Lectotype ♂: 'Barberyn Id, Ceylon, B. F., 23.2.07' (Gen. No. 49). 2 ♂.

Genitalia ♂ (Pl. 6, fig. 25): darkly sclerotized, tegumen rounded, socii small; cucullus broad and short, rounded, with stout spines along outer edge, increasing in size towards base; sacculus small, scobinate, with a wreath of short spines and one thick, blunt thorn. Aedoeagus short, curved.

Bactra monochorda sp. nov.

♂ 14 mm. Very much resembling *metriacma*, but with fore wing narrower, termen less convex and more oblique; longitudinal light stripe narrower. Actually allied to *copidotis* Meyrick.

Genitalia (Pl. 5, fig. 20): tegumen moderately narrow, uncus small, cucullus narrowed, densely covered with short bristles, sacculus very large, bilobed, distal small lobe with 2 bristles, proximal lobe with long strong setae along outer edge; a median projection between cucullus, bearing the distal cluster of spines: a semicircular cone; aedoeagus curved, very long, abruptly narrowed at $\frac{1}{2}$, at top almost flabelliform. Cornuti absent.

Holotype ♂: 'Maskeliya, Ceylon, Green, 11.06' (Gen. No. 35). 1 specimen.

phaeopis Meyrick, 1911, *Proc. Linn. Soc. N.S.W.* **36:** 254 (*Bactra*).

Holotype ♂, allotype ♀: 'Sudest Id., New Guinea, A. S. M., .05' (Gen. ♂ No. 56, ♀ No. 57). 2 specimens.

Genitalia ♂ (Pl. 6, fig. 28): near *minuta*. Tegumen rounded, projection of uncus large, with a comb of strong bristles; socii small, shortly pubescent; cucullus almost circular, bristled along edge, bristles small at top, abruptly changing into stout, slightly sinuate thorns; sacculus small, scobinate, with a transverse band of 3 rows of spines; aedoeagus broad, short, little curved. Genitalia ♀ (Pl. 8, fig. 41): ostium moderate, little sclerotized, connected with rather broad sclerotized rim of 8th segment, signa absent.

phaulopa Meyrick, 1911, *Proc. Linn. Soc. N.S.W.* **36:** 253 (*Bactra*).

Holotype ♀: 'Kei Id., New Guinea' (Gen. No. 58). Unique.

Genitalia (Pl. 8, fig. 42): ostium weak, not sclerotized, its upper surface slightly scobinate. Posterior edge of 8th segment slightly sclerotized at the sides, 9th segment slightly sclerotized. Signa absent.

phenacistis Meyrick: see *copidotis* Meyrick (**syn. nov.**).

scythropa Meyrick, 1911, *Proc. Linn. Soc. N.S.W.* **36:** 254 (*Bactra*).

Holotype ♂: 'Dilli, Timor, D., .5.92' (Gen. No. 55). Another specimen, ♀, from Sunta Id., Timor, D., .5.92. Genitalia identical with *truculenta* Meyrick, 1909, which name supersedes. See *truculenta* Meyrick (**syn. nov.**).

tornastis Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 586 (*Bactra*).

Lectotype ♂: 'Dibidi, N. Coorg, Newcome, 2.10.06' (Gen. No. 34). Paralectotype ♀: 'Gooty, S. India, W. H. C., .07' (without abdomen). Other specimens from Bombay, S. India, T. B. F., .10.17, Nawalopita, Ceylon, J. T., .01, .04, and Karaghoda, Gudjarat, 18.9.19. 5 ♂, 2 ♀.

Genitalia ♂ (Pl. 5, fig. 18): tegumen broad, socii larger than in *truculenta*, weakly long-haired, cucullus with top produced and narrow, densely covered with short bristles along outer edge, distal cluster of spines a semicircular comb on a separate arm; sacculus very broad with strong bristles along outer edge; aedoeagus strong, moderately long, curved, no cornuti.

truculenta Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 586 (*Bactra*).

Lectotype ♂: 'Dibidi, N. Coorg, Newcome, .3.07' (Gen. No. 27). There are two males, with this label; being the oldest material present, they are without doubt the specimens cited in the description. 1 ♀ from Kegalle, Ceylon, T. M. M., .10.09 (Gen. No. 28). 1 ♂, 1 ♀: 'Coimbatore, India, bred .1.17, T. B. F., e. e. *Cyperus rotundus*', with pupal skins of both sexes attached and identical (Gen. ♂ No. 29, ♀ No. 30). 1 ♂: 'Shanghai, China, H., 14.7.35' (Gen. No. 31), 1 ♀ idem, in .5.32 (Gen. No. 32). Other specimens from Calcutta and Pusa, Bengal; Karaghoda, Gudjarat, Dibidi, N. Coorg; Amradhapura and Rambukkhana, Ceylon; S. Andamans and Shanghai, in .2, .6, .7, .8, .10, and .12 from 1858 to 1932. 11 ♂, 7 ♀. In addition 1 specimen very worn and unidentifiable from Honolulu and 1 ♂ which belongs to a distinct species, and is described in this paper.

Genitalia ♂ (Pl. 5, fig. 16): tegumen strong, broad, socii small, weakly hairy, cucullus rather broad, top rounded, with hairs and bristles along ventral edge; sacculus strong, projecting with two short spines at the top and a row of short spines at middle; distal spine-cluster on a separate arm projecting over disk of harpe between cucullus and sacculus, aedoeagus stout, curved, no cornuti.

Genitalia ♀ (Pl. 7, fig. 30): ovipositor lobes elongate, limen a semicircular plate laterally dilated into elongate plates along edge of 8th segment, forming a vertical ridge at each side of ostium, connected by a curved transverse bar, area directly surrounding ostium more or less sclerotized.

Syn. nov. *scythropa* Meyrick, 1911 (see above).

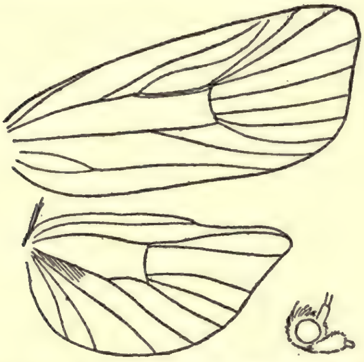
Syn. nov. *geraropa* Meyrick, 1932, *Exot. Micr.* **4:** 147 (*Bactra*).

Lectotype ♀: 'Taihoku, Formosa, S. I., .9.25' (Gen. No. 43). 2 ♀. The genitalia are identical with those of *truculenta* Meyrick, 1909, and the present name must be sunk as a synonym.

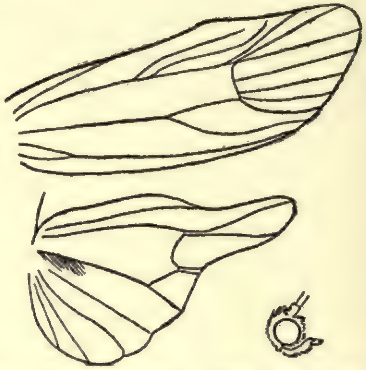
Genus LOBESIA Stainton, 1859

Manual Brit. Butt. Moths **2:** 266

The species belonging to this genus form a very natural group, with such a marked uniformity of colouring and markings of fore wing, that these characters scarcely can be used for the specific discrimination. Only the genotype, *L. reliquana* Hübner, and *L. clarisecta* Meyrick, which are distinctly coloured, form an exception. The species can be separated with certainty only by the study of their genitalia, which show clear-cut specific characters in both sexes. Also the neuration of fore wing in both males and females is quite constant; typical is the position of vein 10, which is strongly sinuate and about three times as near to 11 as to 9, both veins 11 and 10 do not reach costa; 8 is almost connate with 7, parting vein in female running from before 9 to the base of 7, in male scarcely traceable. Another typical feature is the sexual dimorphism: males have narrower fore wings, with costa projecting in a blunt angle at $\frac{3}{8}$ in most species, little curved before and beyond this, while in females the fore wing is elongate-ovate, with costa gradually curved. The hind wing shows a still more striking sexual difference: in females it is of the common Eucosmid subtrapezoidal type (text-fig. 1), coloured mostly greyish-brown, while in males it is apparently in a process of degeneration, several stages of which can be observed; it is whitish, suffused with grey only along apical $\frac{1}{3}$ or $\frac{1}{4}$; its basal area partly pellucid due to its sparse covering of narrow, hair-shaped scales or hairs (*genialis* Meyrick). Its shape varies in different species from triangular with a narrow acute point and a very oblique, but almost straight termen (*reliquana*, *aeolopa*) to almost semicircular with the apex produced into a narrow lobe and with termen deeply concave and scobinate (*genialis*). Parallel to this change of shape the veins undergo a reduction: while in the male of *aeolopa* 2–5 are rather short but normal, in *genialis* 5 is very short and closely approximated to the common stalk of 3 and 4, of which the fork has disappeared entirely (text-fig. 2). An intermediate stage shows the South African *sitophaga* Meyrick with veins 3 and 4 very short and stalked, but termen less concave and the apical lobe still present, but much broader than in *genialis*; and there is an undescribed species from Java, mentioned below, which has no apical lobe and of which the termen is slightly concave



TEXT-FIG. 1. *Lobesia aeolopa* Meyrick, ♀: wing neuration and head.



TEXT-FIG. 2. *Lobesia genialis* Meyrick, ♂: wing neuration and head.

only on vein 5, with veins 3 and 4 stalked. The abdomen in the male possesses a ventral ovate pouch of papilliform, often darkly coloured scales on each side of the 1st and 2nd segments.

The male genitalia with cucullus distinctly separated from the sacculus, the latter mostly with two clusters of strong spines; two types are present: the *reliquana*-type without gnathos, with rather broad cucullus rounded at the top and covered with dense long bristles along the outer edge, and the less specialized *genialis*-type with small, spiked gnathos, and very narrow, elongate cucullus, with short, stout bristles along the outer edge, distal cluster of spines on a short, separate projection. Aedoeagus rather long, curved, without cornuti. Spermatophore coiled.

The female genitalia have a strong colliculum[1] and more or less chitinized distal edge of the 8th segment, sometimes forming a plate before the ostium. Ductus bursae moderately long. Bursa copulatrix without signa.

The present genus is intermediate between *Bactra* Stephens and *Polychrosis* Ragonot. Eight species from Asia are recorded, one of them remains unnamed so far. Also *xylistis* Lower (*Byrsoptera xylistis* Lower, 1901, *Trans. Roy. Soc. S. Aust.*: 77 = *Polychrosis xylistis* Meyrick, 1911, *Proc. Linn. Soc. N.S.W.* **26:** 256) from Australia and a specimen of an undescribed species from Queensland, placed by Meyrick in *Polychrosis botrana* Hübner belong in *Lobesia*.

aeolopa Meyrick, 1907, *J. Bomb. Nat. Hist. Soc.* **17:** 976 (*Lobesia*).

Lectotype ♂: 'Maskeliya, Ceylon, Pole, .5.06' (Gen. No. 4). Paralectotype ♀: 'Maskeliya, Ceylon, Pole, .4.06' (Gen. No. 5). Other specimens from Coimbatore, S. India, T. B. F., bred .1.17 (Gen. No. 8). Formosa, Taihoku, S. I., 10.1.33 (Gen. No. 7). Further from Maskeliya, Ceylon, in .1, .3, .4, .5, .06. Dibidi, N. Coorg, L. N., .11.07. Konkan, Bombay, L. C. V., .05. 3 ♂, 6 ♀. 1 ♀ from Ceylon, Trincomali, E. E. G., .11.06, must be transferred to *fetialis* Meyrick (Gen. No. 6).

Abdominal pouches ovate, genitalia ♂ (Pl. 3, fig. 5): tegumen narrower than in preceding, cucullus rather broad, narrowed in middle, less densely bristled at top, sacculus with a large distal cluster of strong spines, proximal cluster of a few smaller spines; aedoeagus darkly sclerotized, acute; genitalia ♀ (Pl. 4, fig. 10): ovipositor rounded, 8th segment scarcely sclerotized, colliculum very strong, dilated below, with longitudinal fold-like sclerotizations.

clarisecta Meyrick, 1932, *Exot. Micr.* **4:** 308 (*Bactra*).

Holotype ♂, allotype ♀: 'Gulmarg, Kashmir, T. B. F., 8800, .6.31' (Gen. ♂ No. 16, ♀ No. 17).

Genitalia ♂ (Pl. 3, fig. 2): tegumen high, narrow, small socii present; gnathos a narrow transverse band with one horn in middle, cucullus moderately long and broad, little narrowed in middle, densely covered with strong bristles along outer edge, except at top, sacculus little separate, distal cluster of spines forming an obliquely transverse band, proximal cluster absent; aedoeagus short, little curved. Genitalia ♀ (Pl. 4, fig. 13): ovipositor ovate, 9th segment sclerotized, limen very narrow in middle, dilated laterally, colliculum a short cylinder.

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[1] Cf. A. Diakonoff, 1939. *Zoöl. Meded.* **21:** 123.

dryopelta Meyrick, 1932, *Exot. Micr.* **4:** 225 (*Lobesia*).

Lectotype ♂: 'Java, K., .6.31' (Gen. No. 14). 1 ♀ with the same label. (Gen. No. 15). Genitalia also compared with bred material of both sexes on *Ricinus* from Buitenzorg, Java (in the author's collection, Gen. ♂ No. D. 521, ♀ No. D. 522).

Abdominal pouches narrow, but longer than in *aeolopa*. Genitalia ♂ (Pl. 3, fig. 3): very much resembling *aeolopa* but with cucullus broader, its top more oblique, base more projecting outwardly, distal cluster of very strong spines extremely dense, proximal reduced to 2 small spines; aedoeagus more dilated at base. Genitalia ♀ (Pl. 4, fig. 9): ovipositor ovate, limen a curved narrow band, with lateral dilatations, with scobinate and papillate surface, colliculum very strong, with longitudinal sclerotizations, more dilated below than in *aeolopa*.

fetialis Meyrick, 1920, *Exot. Micr.* **2:** 346 (*Polychrosis*).

Holotype ♂: 'Pusa, Bengal, T. B. F., bred .1.16' (Gen. No. 12). Further 1 ♀ from the same locality, bred .9.19 (Gen. No. 13). 2 ♂, 2 ♀.

Abdominal pouches rounded, small. Genitalia ♂ (Pl. 3, fig. 6): tegumen moderately large, top rounded; gnathos a little sclerotized transverse rod with 2 short, median, horn-shaped projections; cucullus long, narrow, colourless bristles at top, strong bristles along edge below, sacculus with sparse bristles, distal cluster small but dense on a separate, rounded projection. Aedoeagus rather short, strongly sclerotized, pistol-shaped. Genitalia ♀ (Pl. 4, fig. 12): ovipositor pointed, short, no other sclerotizations, except colliculum, which is cylindrical, with slightly scobinate surface, moderately sclerotized.

genialis Meyrick, 1912, *J. Bomb. Nat. Hist. Soc.* **21:** 869 (*Lobesia*).

Holotype ♂: 'Peradeniya, Ceylon, Green, .1.08' (Gen. No. 9). 1 ♂ and 1 ♀ from Coimbatore, Ceylon, T. B. F., bred .1.17. (Gen. ♀ No. 10) are referrable to *Lobesia dryopelta* Meyrick.

Abdominal pouches much narrower than in *aeolopa*. Genitalia ♂ (Pl. 3, fig. 4): tegumen large, top rounded; gnathos a transverse band with two curved horn-shaped median projections. Cucullus long, narrow, scobinate and bare at top, below this with short strong bristles along the edge. Sacculus moderate, sparsely bristled at top, distal cluster of spines in a comb on separate projection; aedoeagus pistol-shaped, moderately sclerotized.

proterandra Meyrick, 1921, *Zoöl. Meded.* **6:** 155 (*Lobesia*).

Shillong, Assam, T. B. F., .10.18 (Gen. No. 11). Type, ♀, is in Leiden Museum. A ♀ from that museum, from the type-lot, has been dissected and the genitalia are described below (Gen. No. D. 520).

Abdominal pouches moderate, rounded. Genitalia ♂ (Pl. 3, fig. 7): tegumen high, narrow, cucullus long, narrowed in middle, top rounded, sparsely bristled; sacculus with a dense distal cluster of strong spines, proximal cluster reduced to a few small spines below this; aedoeagus narrow, moderately long. Genitalia ♀ (Pl. 4, fig. 11): ovipositor narrowed at top, limen narrow, dilated laterally, colliculum with excavate upper edge, dilated below, strong.

reliquana Hübner, 1825, *Verz. bek. Schmett.*: 381 (*Asthenia*).

Japan, Wawakisan, S.I., 22.4.20 (Gen. No. 2). China, Tien-Mu-Shan, H., 1,300, 4.32 (Gen. No. 3). 2 ♂. 1 ♀ from Japan, Tokyo, S.I., 7.8.15, is a *Lobesia dryopelta* Meyrick (Gen. No. 1).

The genitalia of both sexes (Pl. 3, fig. 1, ♂) are exactly the same as described and figured by Pierce (*Genit. Brit. Tortr.*: 39, pl. 14, 1922) for *reliquana*. (The author also compared the original slides of Pierce.)

sp. nov.

I abstain from naming this distinct species, of which the ♂ genitalia can be seen on Pl. 3, fig. 8, as the only specimen (from Java, Buitenzorg, reared at the Institute for Plant Diseases on *Sesamum indicum*), is too much damaged. The hind wing is narrowly triangular, with veins 3 and 4 stalked. (In the British Museum (N.H.), Gen. No. 18.)

Genera PARABACTRA Meyrick and BACTRA Stephens

The genitalia of the following South Asiatic and Papuan species are very much like those of the European and North American species of *Bactra*, for which reference may be made to the work of Pierce, 1922 (*Genit. Brit. Tortr*: 40, pl. XIV), and of Heinrich, 1926 (*Bull. U.S. Nat. Mus.* **132:** 81–87, ff. 44–47, 49, 342–348), respectively. The only exceptions are *foederata* and *sociata*, which are in possession of a bifid uncus and suggest a generic difference.

At the time of writing of the present paper it seemed to me preferable to leave them in *Bactra* until we would know more about the genitalia in this and allied genera. Two years later—while this paper still awaits the opportunity of being published—Mr. J. F. Gates Clarke, of the U.S. Bureau of Entomology and Plant Quarantine, Washington, who was then working on the fixation of lectotypes in Meyrick's collection at the British Museum, kindly informed me that both the above-mentioned species are congeneric with *Parabactra arenosa* Meyrick. Mr. Clarke studied the male genitalia of the latter species recently. He now courteously proposes that I include this finding in the present paper, to which proposal I gratefully agree.

Genus PARABACTRA Meyrick, 1910

Ent. Mon. Mag. **46:** 72

foederata Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 582 (*Bactra*).

Lectotype ♂: 'Maskeliya, Ceylon, de Mowbray, .8.04'. Paralectotype ♀: 'Maskeliya, Ceylon, Pole, .4.06' (both without abdomen). 1 ♂, in very bad condition, from Namunakuli, Ceylon, E. E. G., .2.10 (Gen. No. 22). A very distinct species. 2 ♂, 1 ♀.

Genitalia ♂ (Pl. 5, fig. 14): tegumen moderate, uncus bifid, weakly haired at top, socii absent, gnathos paired: a narrow, pending filament on each side. Harpe rather narrow, elongate, with cucullus elongate-lanceolate, weakly haired, sacculus slightly projecting in a blunt angle, with a dense cluster of short spines along middle of margin; aedoeagus strong, curved, cornuti a sheaf of long spines.

sociata Meyrick, 1909, *J. Bomb. Nat. Hist. Soc.* **19:** 583 (*Bactra*).

Lectotype ♂: 'Maskeliya, Ceylon, Pole, .7.05' (Gen. No. 23), Paralectotype ♀: 'Kelawewa, Ceylon, C. C. A., .9.05' (Gen. No. 24). Other specimens from Maskeliya and Namunakuli, Ceylon, E. E. G., .1.04, .5.04, and .2.10. 2 ♂, 3 ♀. Of these, 2 specimens are without abdomen.

Genitalia ♂ (Pl. 5, fig. 15): tegumen short, strong. Uncus bifid: an ear-shaped, weakly hairy projection on each side, a small, unpaired median projection, a fan of long hairs from ventral surface of uncus; socii absent, gnathos paired: a small appendage on each side; harpe elongate, cucullus elongate-lanceolate, weakly hairy, sacculus with outer edge hairy throughout, a projection, densely covered with short spines; aedoeagus strong, straight, cornuti a sheaf of spines. Genitalia ♀ (Pl. 7, fig. 29); ovipositor lobes ovate, moderate, 9th segment elongate, sclerotized, 8th segment sclerotized, forming a U-shaped plate, 2 signa: a small plate with 1 projection above and 2 below and a small hook. (Spermatophore coiled.) Closely allied to preceding.

3. ASIATIC AND PAPUAN CARPOSINIDAE

Genus BONDIA Newman, 1856

Trans. Ent. Soc. Lond. (n.s.) **3:** 289

autocharacta Meyrick: see *characterias* Meyrick (**syn. nov.**).

characterias Meyrick, 1932, *Exot. Micr.* **4:** 312 (*Bondia*).
Holotype ♂: 'Gullmarg, Kashmir, T. B. F., 5800 ft., .6.31'. 1 specimen.

Syn. nov. *autocharacta* Meyrick, 1932, *Exot. Micr.* **4:** 312 (*Bondia*).
Holotype ♂: 'Gullmarg, Kashmir, T. B. F., 5800 ft., .6.31'. 1 ♂, 1 ♀. These two specimens and the preceding belong undoubtedly to the same species, therefore the name *autocharacta* must be sunk as a synonym of *Bondia characterias* Meyrick.

quaestrix Meyrick, 1935, in Caradja and Meyrick, *Mater. Chin. Prov.*: 85 (*Bondia*).
Lectotype ♀: Tien-Mu-Shan, China, H. 5300, .4.32. 1 specimen.

xylinarcha Meyrick, 1930, *Exot. Micr.* **3:** 589 (*Bondia*).
Holotype ♀: 'Biagi, Mambare R., 5000 ft., B. N. G., 1–4.06 (A. S. Meek)'.

Genus CARPOSINA Herrich-Schäffer, 1853

Schmett. Eur. **8:** 38, pl. 12, ff. 1, 2

crypsichola Meyrick, 1910, *Trans. Ent. Soc. Lond.* 1910: 431 (*Carposina*).
Lectotype ♀: 'Pura, Sumatra, D., .91'. 3 ♀.

hercotis Meyrick, 1913, *Exot. Micr.* **1:** 76 (*Carposina*).
Holotype ♂: 'Khasi Hills, Assam, .7.1906'. 1 specimen.

Genus COMMATARCHA Meyrick, 1935

Exot. Micr. **4:** 594

palaeosema Meyrick, 1935, *Exot. Micr.* **4:** 594 (*Commatarcha*).
Holotype ♀: 'Kyoto, Japan, S. I., .34'. 1 specimen.

Genus HETEROGYMNA Meyrick, 1913

Exot. Micr. **1:** 73

collegialis Meyrick, 1925, *Exot. Micr.* **3:** 138 (*Heterogymna*).
Holotype ♂: 'Setekwa R., Dutch N. Guinea, M. 3000' .9.10'. 1 specimen.

comitialis Meyrick, 1925, *Exot. Micr.* **3:** 138 (*Heterogymna*).
Lectotype ♂: 'Weyland Mts., 6000 ft., Dutch N. Guinea. Nov.–Dec. 1920. C., F. & J. Pratt'. 1 specimen.

gyritis Meyrick, 1910, *Trans. Ent. Soc. Lond.*, 1910: 431 (*Paramorpha*).
Lectotype ♂: 'Gunong Ijan, Malay Penins., R., .07'. Another specimen from the same locality, R. .95. 2 ♂.

heptanoma Meyrick, 1925, *Exot. Micr.* **3:** 138 (*Heterogymna*).
Holotype ♂: 'Central Ceram, 4600 ft., Jan. '20. C. F. & J. Pratt'. 1 specimen.

ochrogramma Meyrick, 1913, *Exot. Micr.* **1:** 74 (*Heterogymna*).
Lectotype ♂: 'Bhotan, R., .07'. Buitenzorg, Java, B., 1.3.27. Tien-Mu-Shan, China, H. 5,300, .7.32. Likiang, China, H., .8.34. 3 ♂, 2 ♀.

pardalota Meyrick, 1922, *Exot. Micr.* **2:** 551 (*Heterogymna*).
Lectotype ♂: 'Shillong, Assam. T. B. F. .22'. Other specimens from the same locality, 5,000 ft., in .9.24 and .5.28. 2 ♂, 1 ♀.

zacentra Meyrick, 1913, *Exot. Micr.* **1:** 73 (*Heterogymna*).
Lectotype ♂: 'Kumaon, India, 3.6.12'. Other specimens from Bhim Tal, Kumaon, R. M., 21.6.18. 2 ♂, 1 ♀.

Genus MERIDARCHIS Zeller, 1867

Stett. Ent. Ztg. **28:** 407

aggerata Meyrick, 1910, *Trans. Ent. Soc. Lond.* 1910: 430 (*Meridarchis*).
Lectotype ♂: 'Bandong, Java, R., .07'. Other specimens: Bandong, Java, R., .07, and Mt. Gedeh, Java, B, .8.15. 1 ♂, 3 ♀.

bryodes Meyrick, 1907, *J. Bomb. Nat. Hist. Soc.* **17:** 981 (*Meridarchis*).
Lectotype ♀: 'Khasi Hills, Assam, .6.1906'. 2 ♀.

capnarcha Meyrick, 1938, *Trans. R. Ent. Soc. Lond.* **87:** 519 (*Meridarchis*).
Lectotype ♂: 'Papua, Mt. Tafa, 8500 ft., iii .1934, L. E. Cheesman. B.M. 1934–321. C. 202'. 2 ♂.

concinna Meyrick, 1916, *Exot. Micr.* **1:** 71 (*Meridarchis*).
Lectotype ♂: 'Khasi Hills, Assam, .4.1906'. 2 ♂, 1 specimen without abdomen.

episacta Meyrick, 1906, *J. Bomb. Nat. Hist. Soc.* **17:** 137 (*Meridarchis*).
Lectotype ♂: 'Maskeliya, Ceylon, Pole, 1.04'. Other specimens from Maskeliya and Patinola, Ceylon (Pole, de Mowbray, and G. C. A.). .12.04, .8.05, and .5.06. 2 ♂, 3 ♀.

erebolimnas Meyrick, 1938, *Trans. R. Ent. Soc. Lond.* **87:** 520 (*Meridarchis*).
Holotype ♂: 'Papua, Mt. Tafa, 8500 ft, iii.1934. L. E. Cheesman. B.M. 1934–321. C. 492'. Allotype the same, 'C 493'.

eremitis Meyrick, 1905, *J. Bomb. Nat. Hist. Soc.* **16:** 590 (*Tribonica*).
Lectotype ♂: 'Maskeliya, Ceylon, Pole, .2.04'. Other specimens from the same locality in June, July, and November 1903, 1904, 1905, and 1906. 3 ♂, 7 ♀.

famulata Meyrick, 1922, *Exot. Micr.* **1:** 72 (*Meridarchis*).
Holotype: 'Madulsima, Ceylon, V., .5.06'. 1 specimen without abdomen, recorded by Meyrick as ♀.

globifera Meyrick, 1938, *Trans. R. Ent. Soc. Lond.* **87:** 519 (*Meridarchis*).
Lectotype ♀: 'Papua, Mt. Tafa, 8500 ft. iii, 1934. L. E. Cheesman. B.M. 1934–321. C. 236'. 2 ♂, 2 ♀.

heptaspila Meyrick, 1930, *Exot. Micr.* **3:** 589 (*Meridarchis*).
Holotype ♀: 'Owgarra, B. N. Guinea, A. S. Meek; *Meridarchis heptaspila* Meyr., teste Meyr.'. 1 specimen.

hylactica Meyrick: see *lembula* Meyrick (**syn. nov.**).

lembula Meyrick, 1910, *Trans. Ent. Soc. Lond.* 1910: 430 (*Meridarchis*).
Holotype ♀: 'Bandong, Java, R., .07'. 1 specimen.

Syn. nov. *hylactica* Meyrick, 1938, *Iris* **52:** 87 (*Meridarchis*).
Holotype ♀: 'Mt Guntur, Garoet, West Java, 1350 m., Overbeck leg.'. 1 specimen, conspecific with the foregoing.

niphoptila Meyrick, 1930, *Exot. Micr.* **3:** 588 (*Meridarchis*).
Holotype ♂: 'Mt Goliath. Centr. D. N. Guinea, 5–7,000 ft. Meek; Paravicini Coll., B.M. 1937–383'.

octobola Meyrick, 1925, *Exot. Micr.* **3:** 137 (*Meridarchis*).
Lectotype ♀: 'Central West Buru, 5000 ft. iii–iv.22. C., F. & J. Pratt'. 2 ♀.

ocytoma Meyrick, 1938, *Iris* **52:** 14 (*Meridarchis*).
Lectotype ♂: 'Likiang, China, 10500–12000, H., .17.8.35'. Other specimens: Likiang, China, H., .6.34, .7.34. 4 ♂, 1 without abdomen.

phaeodelta Meyrick, 1906, *J. Bomb. Nat. Hist. Soc.* **17:** 138 (*Meridarchis*).
Lectotype ♂: 'Maskeliya, Ceylon, Pole, .6.05'. Other specimens from Maskeliya, Opiya, Ceylon, and from Palni Hills, S. India (Campbell), 6,000 ft., .06. 4 ♂, 6 ♀.

picroscopa Meyrick, 1930, *Exot. Micr.* **3:** 588 (*Meridarchis*).
Holotype ♂: 'Biagi, Mambare R., 5000 ft. B. N. G. i–iv.06. (A. S. Meek). Paravicini Coll. B.M. 1937–383. M. 570'. 1 specimen.

pseudomantis Meyrick, 1920, *Exot. Micr.* **2:** 338 (*Meridarchis*).
Holotype ♀: 'New Guinea, Moroka, 3500, A., .10.95'. 1 specimen.

reprobata Meyrick, 1920, *Exot. Micr.* **2:** 338 (*Meridarchis*).
Lectotype ♀: 'Nagpur, India, T. B. F. 6.6.16. ex larva fruits *Eugenia jambolana*'. Other specimens: Kashmir, bred .11.17 T. B. F.; Mahabashwa, R. M., bred .5.30. 7 ♀.

scyrodes Meyrick, 1922, *Exot. Micr.* **2:** 30 (*Meridarchis*).
Lectotype ♂: 'Coimbatore, S. India, T. B. F., bred 2.2.14'. Another specimen from the same locality, bred 9.2.14. 2 ♂.

syncolleta Meyrick, 1928, *Exot. Micr.* **3:** 404 (*Meridarchis*).
Lectotype ♀: 'Port Blair, Andamans, F., .10.07'. 2 ♀.

trapeziella Zeller, 1867, *Stett. Ent. Ztg.*, **28:** 408, pl. 2, f. 5.
Khasi Hills, .5.06. 1 specimen without label. 4 ♀ (Zeller's type specimen is preserved in the British Museum).

theriosema Meyrick, 1928, *Exot. Micr.* **3:** 404 (*Meridarchis*).
Holotype ♀: 'New Ireland, November 1923 (A. F. Eichhorn)'. 1 specimen.

vitiata Meyrick, 1913, *Exot. Micr.* **1:** 72 (*Meridarchis*).
Lectotype ♂: 'Khasi Hills, Assam, .4.06'. Kalimpong, Sikkim, L., .29. 2 ♂.

zymota Meyrick, 1910, *Proc. Linn. Soc. N.S.W.* **35:** 146 (*Meridarchis*).
Holotype ♂: 'Woodlark I., New Guinea, A. S. M. 4.97'. Another specimen from Port Darwin, N. Australia, F. P. P., .10. 1 ♂, 1 ♀.

Genus PICRORRHYNCHA Meyrick, 1922

Exot. Micr. **2:** 550

scaphula Meyrick, 1922, *Exot. Micr.* **2:** 550 (*Picrorrhyncha*).
Lectotype ♀: 'Shillong, Assam, T. B. F., .9.17'. 2 ♀.

Genus PARAMORPHA Meyrick, 1881

Proc. Linn. Soc. N.S.W. **6:** 696

aulata Meyrick, 1913, *Exot. Micr.* **1:** 71 (*Paramorpha*).
Lectotype ♀: 'Maskeliya, Ceylon, Pole, .12.06'. 3 ♀.

laxeuta Meyrick, 1906, *J. Bomb. Nat. Hist. Soc.* **17:** 138 (*Paramorpha*).
Lectotype ♀: 'Matale, Ceylon, I. P., .1.04'. Other specimens from Maskeliya, Patipola, and Bandarawela, Ceylon, .5.06 and .4.07 (de Mowbray, G. C. A., I. P.). 6 ♀.

4. OTHER CARPOSINIDAE IN THE BRITISH MUSEUM WITH DESCRIPTION OF NEW SPECIES

The following material, chiefly from the collection of the late Lord Walsingham, was kindly placed at the disposal of the author by Mr. W. H. T. Tams for determination. Five species are described as new, and seven other species recorded. The types are preserved in the British Museum.

Bondia quaestrix Meyrick, 1935, in Caradja and Meyrick, *Mater. Chin. Prov.*: 85.
JAPAN, 1886 (Pryer). 4 ♀ (Wals. Coll.).

Carposina hercotis Meyrick, 1913, *Exot. Micr.* **1:** 76.
MALAYA, Perak, Gunong Hijan, 4,000–4,900 ft., 1891 (Doherty). 1 ♀ (Wals. Coll.).

Heterogymna collegialis Meyrick, 1925, *Exot. Micr.* **3:** 138.
DUTCH NEW GUINEA, Snow Mts., Upper Setekwa R. 2,000–3,000 ft., Aug. 1910; Snow Mts., Setekwa R., up to 3,500 ft., Oct.–Dec. 1910. (A. S. Meek.)

Meridarchis drachmophora sp. nov.

δραχμή = a coin; φέρω = to carry

♂ 32 mm. Head glossy brownish-ochreous, face whitish. Palpi rather long, porrect, ochreous-brownish, dorsal fringe longer, pale ochreous, ventral shorter, brown. Antennal ciliations about 1. Thorax brownish-ochreous, slightly mixed with brown. Abdomen pale ochreous, anal tuft ochreous. Fore wing with 3 and 4 free; elongate, costa little curved at base, straight posteriorly, gently arched before apex, apex acute, slightly produced, termen oblique, little curved. Glossy ochreous, densely scattered with brown, which forms an indistinct central suffusion in disk above middle and a straight transverse fascia before termen; about 5 round brown spots of somewhat raised scales in middle of disk, each narrowly edged by ground-colour; termen suffused dark brown; costa paler posteriorly, with some 6 dark brown dots. Cilia with basal half ochreous-brownish, apical half pale-ochreous with a darker median line. Hind wing pale ochreous, cilia pale ochreous, brighter and with a median shade around apical $\frac{1}{3}$ of wing. Legs pale ochreous, fore pair suffused with brown, median tibia tinged brown before apex.

Central Dutch New Guinea, Mt. Goliath, about 139° longitude, 5,000–7,000 ft., Jan.–Feb. 1911 (A. S. Meek). 2 ♂ (Type ♂ in B.M.). Belongs to the *trapeziella-aggerata* group.

Meridarchis dryas sp. nov.

δρυάς = a wood-nymph

♂ ♀ 19–28 mm. Head pale ochreous. Palpi rather long, ascending, brown, articulation between joints 2 and 3 pale ochreous. Antennal ciliations over 1. Thorax pale ochreous, densely suffused with brownish. Abdomen pale ochreous, slightly suffused with greyish, anal tuft ochreous-whitish. Fore wing with 3 and 4 free; elongate, rather narrow, costa almost straight, slightly curved before apex, apex not produced, termen very slightly sinuate above, little oblique. Glossy pale ochreous, with some 6 more or less distinct oblique transverse rows of raised sandy-brownish scales, the 3rd and the 5th row dissolved into discal and sub-costal round patches of raised sandy-brownish scales; dark coffee-brown suffusion indistinct in basal half, forming a conspicuous large discal upturned semilunar longitudinal mark in disk above middle at $\frac{3}{4}$, its posterior end sometimes reaching costa; a suffused transverse dark coffee-brown fascia before termen, the latter suffused sandy-brownish, this suffusion somewhat extended basally along veins; a row of suffused dark brown dots along costa. Cilia pale ochreous, with tips and a median line brownish. Hind wing pale ochreous-greyish, brighter along edge. Cilia pale ochreous, glossy. Legs light ochreous, fore pair more, mid pair less evenly suffused with brown.

Assam: Mao, N. Manipur, 5,000–7,000 ft., Aug.; Naga Hills, Kohima, 4,700 ft., June 1889 and Golaghat (Doherty, Paravicini Coll.). 2 ♂ and a rather damaged ♀ (holotype ♂ and allotype ♀ in B.M.). Allied to *Meridarchis aggerata* Meyrick.

Meridarchis ensifera sp. nov.

♂ ♀ 26–32 mm. Head and thorax whitish. Palpi long, porrect, in ♀ suffused brownish at base. Abdomen whitish, anal tuft in ♂ pale ochreous. Fore wing with 3 and

4 free; elongate, narrow, costa gently and gradually arched along basal $\frac{3}{4}$, apex acute, produced, termen sinuate, very oblique. Glossy white, slightly scattered with brownish-greyish on apical $\frac{1}{3}$ of wing. An indistinct pale fuscous suffusion on $\frac{3}{4}$ of costa, reaching to middle of wing. Markings dark greyish-brown: on costa a streak along base and a row of some 6 dots, along termen a row of dots on veins, a conspicuous inwardly oblique curved streak of somewhat raised scales across wing at about $\frac{2}{5}$, not reaching costa and dorsum; a much narrower and paler transverse outwardly concave vertical streak before $\frac{2}{3}$, from dorsum not reaching costa, an indistinct suffusion from costa before apex to tornus. Cilia glossy greyish-whitish, with interrupted median shadow. Hind wing glossy whitish, with narrow greyish edge, cilia greyish-whitish. Legs whitish, fore pair suffused with greyish.

SIKKIM, Tanglo, 10,000 ft., July 1886 (H. J. Elwes, Wals. Coll.). 1 ♂, 1 ♀, (Type ♀ in B.M.). Allied to *Meridarchis excisa* Wals.

Meridarchis niphoptila Meyrick, 1930, *Exot. Micr.* **3:** 588.
CENTRAL DUTCH NEW GUINEA, Mt. Goliath, 5,000 ft., about 139° long., Mar. 1911 (A. S. Meek). 1 ♀ (Paravicini Coll.).

Meridarchis reprobata Meyrick, 1920, *Exot. Micr.* **2:** 338.
S.E. BORNEO, Pulo Laut I., 1891 (Doherty) 1 ♀, damaged (Wals. Coll.).

Meridarchis rodea sp. nov.

ῥόδεος = rose coloured

♂ ♀ 19–21 mm. Head whitish-ochreous. Palpi moderate, ascending in ♂, long, porrect in ♀, pale ochreous, basal half of median joint reddish-brown. Antennal ciliations 1. Thorax pale fuscous and ochreous, tinged reddish-brown. Abdomen fuscous-greyish, anal tuft pale ochreous. Fore wing with 3 and 4 connate; elongate, rather broad posteriorly, costa very slightly curved at base and apex, straight in middle, apex almost rounded, termen straight, little oblique, dorsum sinuate at base. Pale ochreous, except at base and before termen, suffused light fuscous, slightly tinged pink. Other markings dark reddish-brown: a suffusion of dots forming a large triangular patch from $\frac{1}{3}$ to $\frac{3}{4}$ of costa, with top reaching to middle of disk at about $\frac{2}{3}$; a suffused transverse fascia almost touching termen, not reaching costa and tornus; costa along basal half and termen suffused reddish-brown. Cilia light ochreous, with greyish longitudinal streaks, greyish in tornus. Hind wing and cilia light grey. Legs pale ochreous, fore pair suffused with brownish.

DUTCH NEW GUINEA, Snow Mts., Upper Setekwa River, 2,000–3,000 ft., Sept. 1910; BRITISH NEW GUINEA, Owgarra (A. S. Meek, Paravicini Coll.). 1 ♂, 1 ♀, damaged. (Type ♂ in B.M.) Probably allied to *Meridarchis erebolimnas* Meyrick.

Meridarchis vitiata Meyrick, 1913, *Exot. Micr.* **1:** 72.
ASSAM, Kohima, Naga Hills, 4,700 ft., June 1889 (Doherty). 1 ♂ (Wals. Coll.).

Paramorpha laxeuta Meyrick, 1906, *J. Bomb. Nat. Hist. Soc.* **17:** 138.
CEYLON, Pundaloya, 3,500–4,500 ft.; Nawalapitiya 2,000–2,500 ft.; Colombo; 1889–1891 (Green, Pole, McWood). 1 ♂, 9 ♀ (Wals. Coll.).

Picrorrhyncha atribasis sp. nov.

♂ 11 mm., ♀ 14–17 mm. Head glossy brownish-grey. Palpi rather long, in ♂ subascending, dark brown, paler beneath, in ♀ porrect, with terminal joint narrow, cylindrical, moderate; dark brown, with a light tip. Antennae simple. Thorax and abdomen dark brownish-grey. Fore wing with 2 from before angle; elongate, very narrow, acutely pointed, termen almost straight, very oblique. Whitish, rather densely suffused with glossy light greyish-brown on apical $\frac{1}{4}$ of wing and forming an elongate triangular suffusion along costa from $\frac{1}{4}$ to $\frac{3}{4}$, which reaches below $\frac{1}{2}$ of wing; basal $\frac{1}{6}$ blackish-brown, with straight inwardly oblique edge of raised blackish scales; a continuous row of dark brown dots along costa, termen and tornus; about 4 oblique, transverse rows of small raised dark-brown scale-tufts, indistinct and dissolved into small dark dots. Cilia brownish-grey. Hind wing with very narrow and produced apex, grey, cilia grey. Legs light, suffused dark brown along upper side, except on articulations of the tarsal joints.

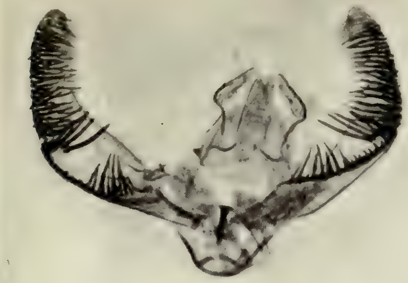
PUNJAB, Dharmsala, 1879 (Hocking, Wals. Coll.). 1 ♂, 4 ♀ (holotype ♀ and allotype ♂ in B.M.). This is the second species of this interesting genus.

BRITISH MUSEUM NATURAL HISTORY
PRESENTED
27 SEP 1950

PLATE 3

MALE GENITALIA OF *LOBESIA* SPP.

1. *L. reliquana* Hübner
2. *L. clarisecta* Meyrick
3. *L. dryopelta* Meyrick
4. *L. genialis* Meyrick
5. *L. aeolopa* Meyrick
6. *L. fetialis* Meyrick
7. *L. proterandra* Meyrick
8. *L.* sp. nov.



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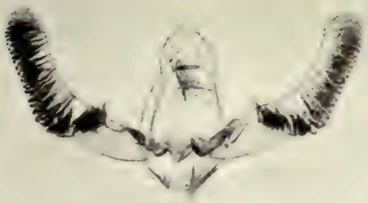

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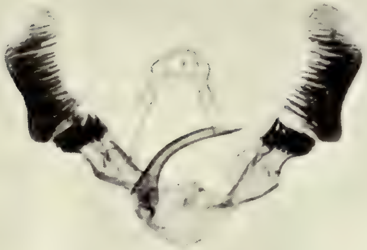

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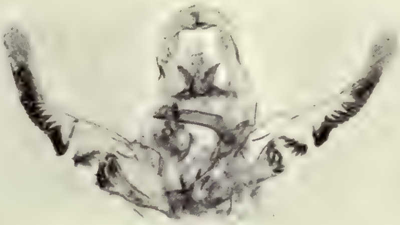

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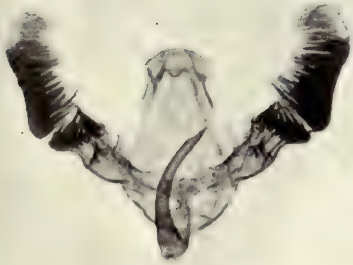

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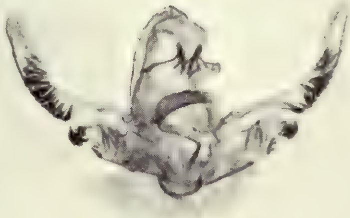

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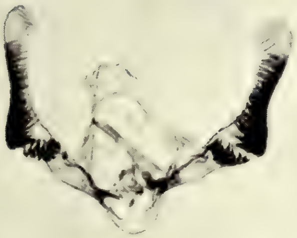

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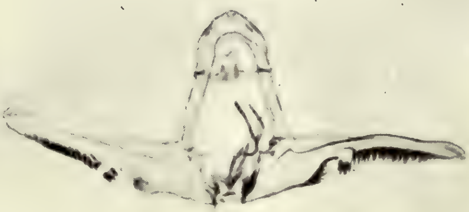

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Photo. Tams

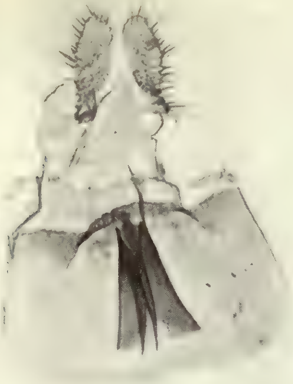
MALE GENITALIA OF *LOBESIA*

PLATE 4

FEMALE GENITALIA OF *LOBESIA* SPP.

9. *L. dryopelta* Meyrick
10. *L. aeolopa* Meyrick
11. *L. proterandra* Meyrick
12. *L. fetialis* Meyrick
13. *L. clarisecta* Meyrick

BRITISH MUSEUM NATURAL HISTORY



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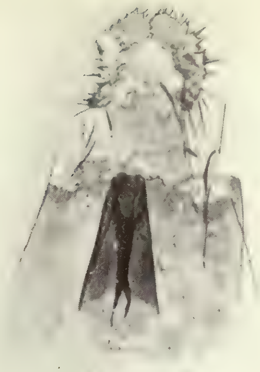

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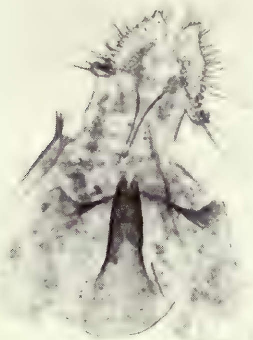

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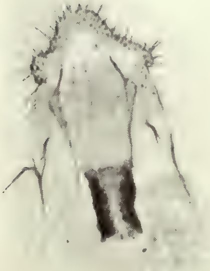

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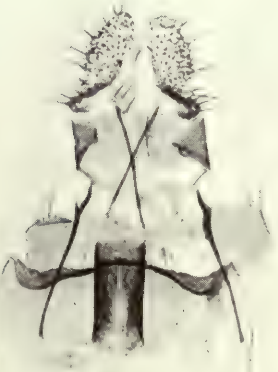

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Photo. Tams

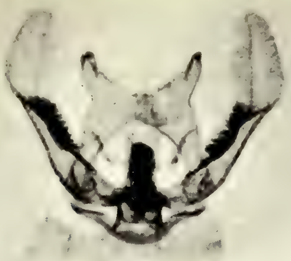
FEMALE GENITALIA OF *LOBESIA*

PLATE 5

MALE GENITALIA OF *BACTRA* SPP.

14. *B. foederata* Meyrick
15. *B. sociata* Meyrick
16. *B. truculenta* Meyrick
17. *B. coronata* sp. nov.
18. *B. tornastis* Meyrick
19. *B. metriacma* Meyrick
20. *B. monochorda* sp. nov.
21. *B. furfurana* Hübner

BRITISH MUSEUM
NATURAL HISTORY



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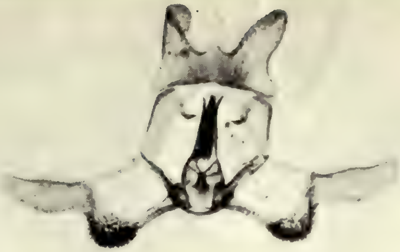

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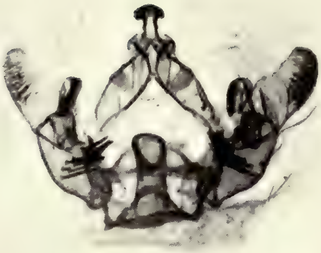

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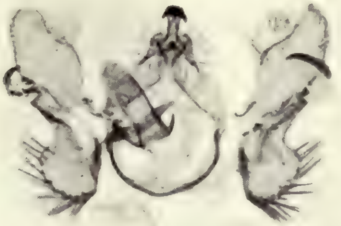

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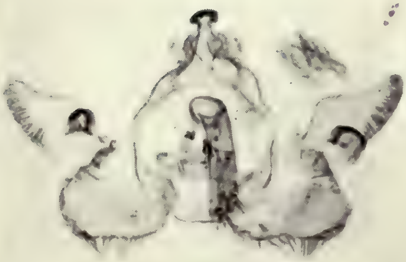

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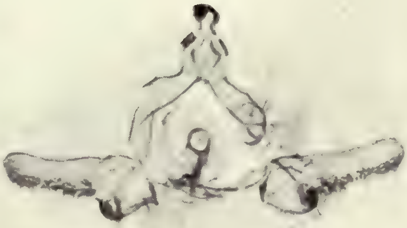

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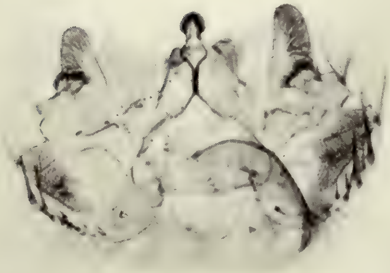

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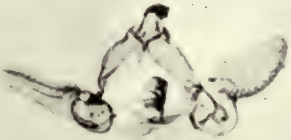


21

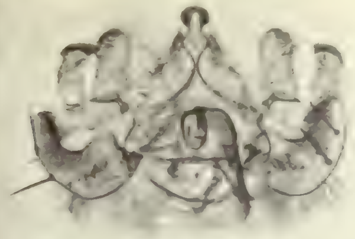
Photo. Tams

MALE GENITALIA OF *BACTRA*

PLATE 6

MALE GENITALIA OF *BACTRA* SPP

22. *B. leucogama* Meyrick
23. *B. honesta* Meyrick
24. *B. graminivora* Meyrick
25. *B. minima* Meyrick
26. *B. copidotis* Meyrick
27. *B. cerata* Meyrick
28. *B. phaeopis* Meyrick



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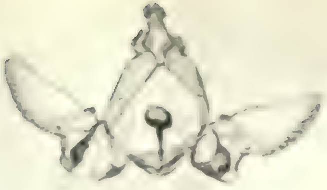

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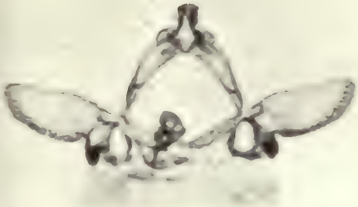

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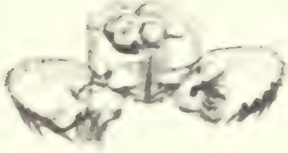

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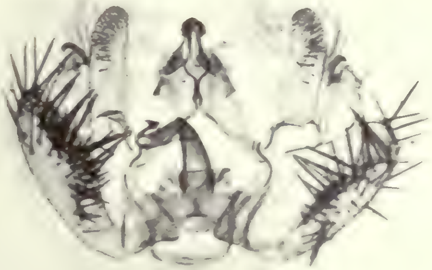

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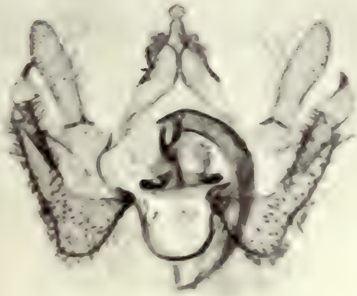

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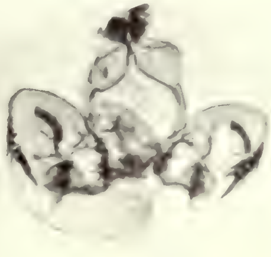


28

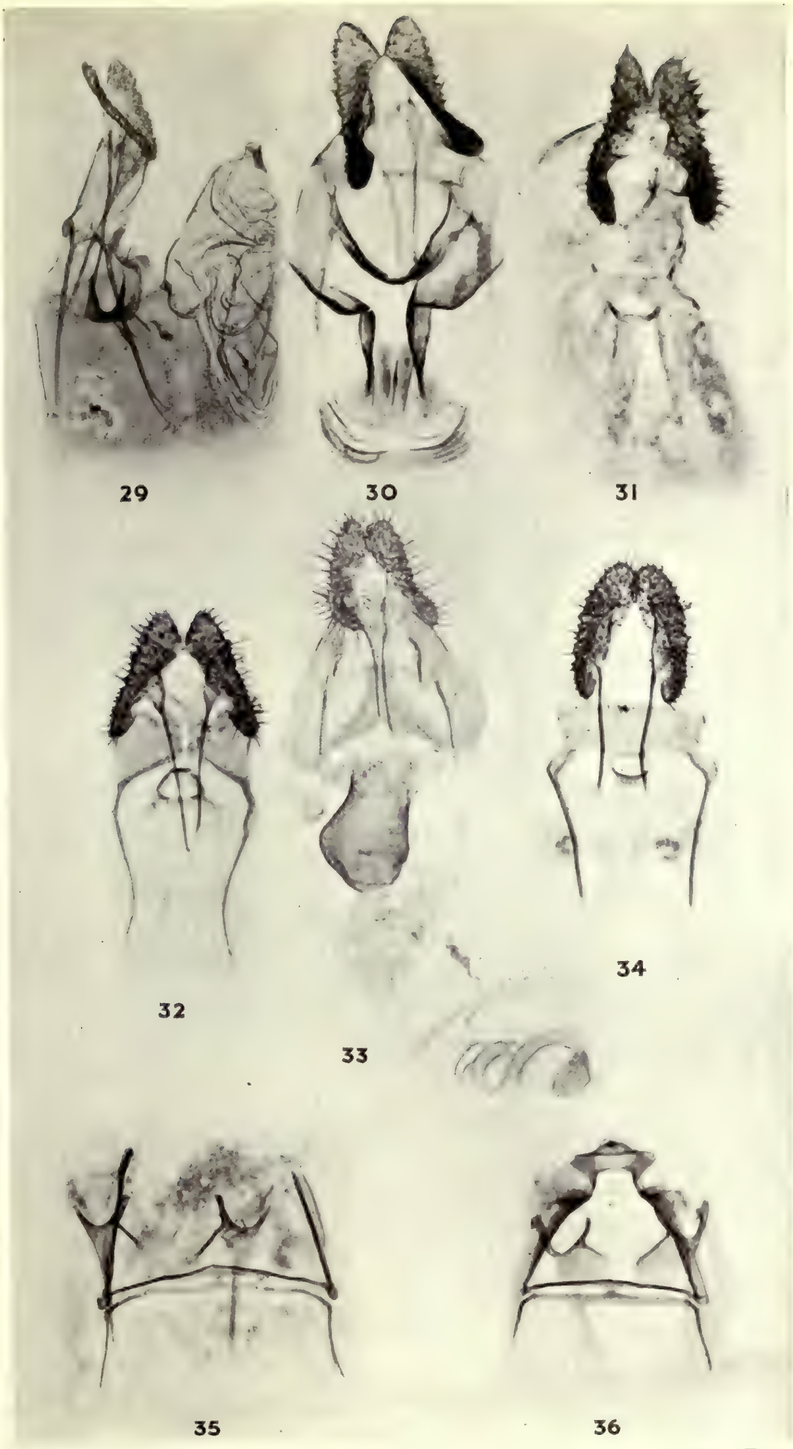
Photo. Tams

MALE GENITALIA OF *BACTRA*

PLATE 7

FEMALE GENITALIA OF *BACTRA* SPP.

29. *B. sociata* Meyrick
30. *B. truculenta* Meyrick
31. *B. metriacma* Meyrick
32. *B. furfurana* Hübner
33. *B. leucogama* Meyrick
34. *B. graminivora* Meyrick
35. 1st abdominal sternite of *B. furfurana* Hübner ♀
36. the same of *B. graminivora* Meyrick ♀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36

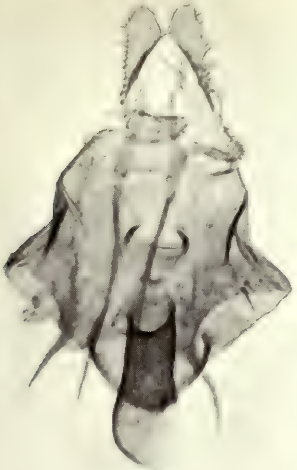
Photo. Tams

FEMALE GENITALIA OF *BACTRA*

PLATE 8

FEMALE GENITALIA OF *BACTRA* SPP.

37. *B. copidotis* Meyrick
38. *B. honesta* Meyrick
39. *B. cerata* Meyrick
40. *B. erasa* Meyrick
41. *B. phaeopis* Meyrick
42. *B. phaulopa* Meyrick



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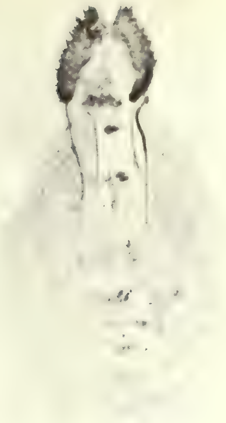

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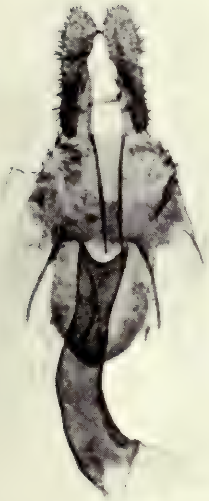

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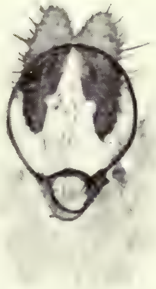

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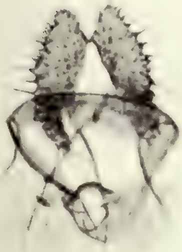

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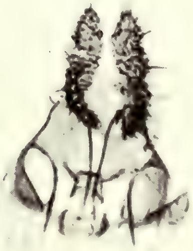

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Photo. Tams

FEMALE GENITALIA OF *BACTRA*

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ON THE SYSTEMATICS AND ORIGIN OF THE GENERIC GROUP *OXYPTILUS* ZELLER

(LEP. ALUCITIDAE)

STANISŁAW ADAMCZEWSKI

BULLETIN OF
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ENTOMOLOGY Vol. 1 No. 5
LONDON : 1951

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BY
STANISŁAW ADAMCZEWSKI
Polish Museum of Zoology, Warsaw

BRITISH MUSEUM NATURAL HISTORY

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By STANISŁAW ADAMCZEWSKI

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1. INTRODUCTION

This work was originally submitted for publication in the *Annales Musei Zoologici Polonici* in Warsaw, and was actually being printed in 1939 when a German raid destroyed the printing-house and with it my manuscript and the proofs. Fortunately drawings and notes escaped destruction, and I have therefore been able to reconstruct my work, though in a somewhat altered form. I have deliberately retained therein for documentary reasons data relating to material no longer in existence, particularly the information relating to the location of some type specimens in the Polish Museum of Zoology. The entomological collections of that institution were completely destroyed by the Germans a few years later (1944), including all the types mentioned below. Other material, including type specimens, was located in the museums of Bremen and Budapest, and I have no information as to whether this has survived the ravages of war.

The results have been amplified as a consequence of the examination of supplementary material during my stay in London in 1947. Thus I have added two species—*Capperia tamsi* sp.n. and *Procapperia linariae* Chrétien—which were not previously included. Many new data concerning the geographical distribution of other species have been added. The value of the results achieved has been greatly enhanced through my having the opportunity of reviewing all the available types in the British Museum (Natural History).

The section dealing with the phylogeny of the group, formerly based mainly on analyses of morphology, geographical distribution, and ecological data, has been modified as a result of increased knowledge gained from a close study of the works of Wegener, Du Toit, Zeuner, and Jeannel. However, the main aim of these investigations has remained the systematic revision of the group. The phylogenetic studies are only provisionally sketched to supplement the taxonomic part of the work.

Much more material than that at present available to me, and more biological as well as genetic investigations, are necessary before an adequate phylogenetic treatment of the group can be attempted as a separate subject.

The systematic part of this work is based mainly on the arranged material of the generic group in various European museums, but also on material of my own collecting.

The systematics of the group have been entirely revised, including the taxonomic values of the generic and trivial names, and in the course of the work it has been found necessary to resurrect some synonyms and to distinguish some new genera and species.

The classification of the group has been based mainly on the morphology of the copulatory apparatus. The whole *Oxyptilus* complex (sensu Zeller, 1841) has been disposed within the compass of ten genera, including one new and six resurrected genera. Of these it has been possible to work out in detail only part, viz. *Capperia* Tutt, *Procapperia* gen.n., *Geina* Tutt, *Sphenarches* Meyrick, and in part *Oxyptilus* Zeller and *Crombrugghia* Tutt. The remainder (generic group *Trichoptilus* s.l.) have not yet been adequately examined, though they are recognized as forming a part of this particular complex, and will, it is hoped, be worked out in detail later.

A novelty in this particular study is the attempt to test the value of the classification based on morphology by taking into account the biosystematic features of the systematic units drawn from their ecology, geographical distribution, and phylogeny. Unfortunately I have so far had no opportunity to verify my conclusions by a study of the ontogeny and genetics of the species examined.

Here I would like to express my thanks to the Trustees of the British Museum and to Mr. N. D. Riley, the Keeper of the Department of Entomology in the British Museum (Natural History), for allowing me the opportunity of completing this work in that institution, and for their help in the matter of publication. I am very grateful to Mr. W. H. T. Tams, who has charge of the Heterocera in the British Museum, and to Mr. T. Bainbrigge Fletcher, of Stroud, a recognized authority on the Alucitidae, who by their great help enabled me to complete my manuscript, removing from my path all the difficulties I encountered in this work. The photographs on Plates X, XI, and XII were made by Mr. W. H. T. Tams.

2. HISTORICAL ACCOUNT OF THE GROUP

The group of species which is the subject of this work has always been a fascinating field of study for the systematic worker. It was established by Zeller in 1841, and he described the majority of the central European species belonging here. However, the group has not been thoroughly revised during the past hundred years.

Before Zeller's publications the names of no more than three species were involved:

1. *Alucita didactyla* Linnaeus, 1758.
2. *Alucita chrysodactyla* Denis et Schiffermüller, 1775.
3. *Alucita trichodactyla* Denis et Schiffermüller, 1775.

These three species are the representatives in our present classification of the three genera: *Geina* Tutt, *Oxyptilus* Zeller, and *Capperia* Tutt. Linnaeus in 1761 recorded his *didactyla* as feeding '*Geo rivali*'. De Geer in 1771 described the biology of the same species, living on *Geum rivale*. Hübner[1] in his *Beiträge* (1790) published some remarks on the name '*trichodactyla* des Syst. Verz.' and a few years later in the *Sammlung* (1800–19)[1] he published the coloured figures of two forms under the same name *trichodactyla*. However, we now can see that his figure 18 only is *trichodactyla*, figure 9 being *chrysodactyla*. The figures of the caterpillar and pupa of *trichodactyla*, together with the food-plant *Leonurus cardiaca* showing the characteristic damage, published by Hübner in his *Geschichte* (1818–22) confirm us in the conclusion that Hübner was figuring the species described later by Stange (1882) as *leonuri*. Laspeyres in 1805 expressed doubt whether '*didactyla* Linn.' and '*didactyla* Schiff.' were the same species. Charpentier, after comparing the original specimens in Schiffermüller's collection, stated in 1821 that '*chrysodactyla* Schiff.' and '*didactyla* Schiff.' were identical and that they were very similar to '*trichodactyla* Schiff.', and that those forms were figured by Hübner as *trichodactyla* (figs. 9 and 18). It is true that Hübner thought that the three forms belonged to the same species and clearly synonymized them in the *Verzeichniss* (1826) under the name *trichodactyla*. So far as we can judge from the data recorded in the literature, the true *didactyla* L. did not exist in Schiffermüller's collection, but only a species of *Oxyptilus* similar to *chrysodactyla*, *pilosellae*, or *ericetorum*, which at that time was undescribed and was later distinguished by Zeller. Treitschke (1833), in describing the species living on *Leonurus*, chose from the so-called synonyms the oldest name '*didactyla* L.', overlooking the fact that Linnaeus had defined that species as living on *Geum rivale* and not on *Leonurus*. Also Duponchel in 1838 used the name *didactylus* for the only species of the group under review known to him. Later (1845) Duponchel excluded from *didactylus* as a different species '*chrysodactylus* W.V.', giving quite correctly the following synonymy: '*hieracii* Zell. = *trichodactyla* Hb. fig. 9 = *chrysodactyla* W.V.' In 1839 Zeller for the first time became interested in this group and distinguished three species: (1) Without a spot on the hind wings (*Pterophorus paludum*), (2) with a spot in the middle of the third feather of the secondaries (*Pterophorus tristis*), and (3) *Pterophorus didactylus* Linn. Under the last name Zeller mixed three species: (*a*) genuine *didactylus* L. bred by De Geer on *Geum*, (*b*) *trichodactylus* Denis et Schiffermüller living on *Leonurus* (data taken from Treitschke), and (*c*) his own specimens bred on *Hieracium umbellatum*, and later described by him as *Oxyptilus hieracii*. In 1841 Zeller divided the genus *Pterophorus* into groups. One of them is the *Oxyptilus* group, which contains five species: *tristis* Zeller, *pilosellae* Zeller, *obscurus* Zeller (afterwards synonymized with *parvidactylus* Haworth), *hieracii* Zeller, and *trichodactylus* Hübner. Zeller was very careful not to continue Treitschke's (1833) and Duponchel's (1838) synonymy: '*trichodactylus* Hbn. = *didactylus* L.' Therefore, not knowing (on his own showing) *didactyla* Linn., to which he did not allow separate status, he only stressed the similarity of the description of *didactyla* and his *hieracii*; at the same time he mentioned that De Geer's description of the caterpillar showed the differences between *hieracii* and *didactyla*. Unfortunately, under the name '*trichodactylus* Hb.' Zeller put the true *didactyla* L., as we can clearly see from his description, not knowing that in Schiffermüller's collection *didactyla* was not properly determined, and that both

---

[1] For dates of Hübner's publications *vide* Hemming, 1937.

Hübner's and Treitschke's synonymy of that species were also wrong. In the same publication Zeller discussed Schiffermüller's species, basing his views on specimens which have been recognized as identical with Schiffermüller's types in the Vienna collection. Zeller's studies resulted in the discovery that *chrysodactyla* D. & Schiff. is the same as *hieracii* Zeller, and that *trichodactyla* D. & Schiff. is synonymous with *Oxyptilus obscurus* Zeller var. *b*. As a pioneer expert Zeller showed himself to be remarkably competent and his opinions and notes are of the greatest value in helping us to arrive at a proper synonymy. In 1847 Zeller gave descriptions of three new species from southern Europe: *Oxyptilus distans*, *O. laetus*, and *O. marginellus*. Zeller's most complete elaboration of that group was published in 1852. There Zeller included in the genus *Oxyptilus* twelve species: *kollari* Stainton, *tristis* Zeller, *distans* Zeller, *laetus* Zeller, *wahlbergi* Zeller, *caffer* Zeller, *pilosellae* Zeller, *hieracii* Zeller, *ericetorum* Zeller, *trichodactylus* Hübner, *obscurus* Zeller, and *marginellus* Zeller. At the same time he included in the genus *Aciptilia* two species, *paludum* Zeller and *siceliota* Zeller, wrongly associated by later systematists with the genus *Trichoptilus*, together with Zeller's *Oxyptilus wahlbergi*. Although in Zeller's genus *Oxyptilus* we see species belonging to six genera (see Systematic Revision, pp. 327 *et seq.*), we must credit Zeller with correctly separating his own species *paludum* and *siceliota* from *wahlbergi*. From the species included by Zeller in *Oxyptilus* only *wahlbergi* and *caffer* were removed by later authors to the newly described genera *Trichoptilus* and *Sphenarches*, and once again *trichodactylus* Hübner was wrongly treated as a synonym of *didactyla* L. The genus *Trichoptilus* was described by Walsingham in 1880 for the North American species *pygmaeus* Walsingham. Later the species *siceliota* Zeller and *paludum* Zeller (vide Meyrick, 1886), of completely different morphology, were wrongly added to this genus. The genus *Sphenarches* was described by Meyrick (1886) for Zeller's *caffer*. Walsingham (1887) wrongly stated that the North American species *periscelidactylus* Fitch also belonged here (vide genus *Geina* Tutt). This systematic arrangement has been maintained right up to the present day. Zeller's systematics, which made a great step forward a hundred years ago, are far from perfect. Zeller united in one genus various forms very far apart from each other. To-day species known to Zeller as *Oxyptilus* are classified in six different genera, and this position would have been attained long ago had not the recognized authorities on the so-called Microlepidoptera—Staudinger and Rebel on the Continent, and Meyrick in England, with the majority of their colleagues and most of the collectors, remained so conservative and adverse to any deeper investigation into the systematics of this group. I must, however, draw particular attention to the work of one student of the Lepidoptera, namely, J. W. Tutt. In volume v of his remarkable work *A Natural History of the British Lepidoptera* (1907) Tutt elaborated a reformed classification of the British Alucitidae, based not only on the external morphology of the imagines, but on the synthesis of all the available features of the imagines, together with the morphological and ecological characteristics of the early stages. One may lay particular stress on Tutt's profound grasp of the taxonomy of this group, because other students, working on much richer material from a terrain far wider than Britain, have failed to appreciate the systematics of this group in their proper proportions. Tutt divided the species at that time included in *Oxyptilus* Zeller into the following genera: *Oxyptilus*

Zeller, *Crombrugghia* Tutt, *Geina* Tutt, and *Capperia* Tutt. He created also a genus *Buckleria* Tutt for *paludum* Zeller, formerly wrongly placed in *Trichoptilus* Walsingham. For the same reasons Tutt created another new genus *Stangeia* for the south European species *siceliota* Zeller. Unfortunately Tutt did not describe some of his new genera and through lack of such descriptions they may be considered by some systematists as *nomina nuda*. On the other hand, when Tutt proposed a new genus for a particular species, he proposed a monotypic genus with a type and this is accepted by the majority of taxonomists. Tutt classified the European species known to him, then grouped in the two genera *Oxyptilus* Zeller and *Trichoptilus* Walsingham, in six genera, excluding Walsingham's genus *Trichoptilus* from the European fauna. Unfortunately Tutt's classification was not only rejected, but it met with criticism and disapproval. Meyrick (1913) synonymized all Tutt's genera. Barnes and Lindsey (1921), in their *Monograph of North American Plumes*, criticized Tutt's systematics in a way that merely reflects discredit on themselves. Quite apart from that, they wrote: 'We follow Meyrick's synonymy. *Geina* Tutt is, of course, a synonym of *Pterophorus*. We are not familiar with the types of *Capperia* and *Crombrugghia* in nature but from Tutt's remarks we judge these genera to be of the same character as others of his, and therefore happily suppressed. We regard a genus as a systematic unit and not a biological division and feel that when it loses its value for classification it has lost the right to exist.' The scientist of to-day aims at a natural classification of living organisms, based on all the available data; the too-slavish adherence to the artificial systematics of the past century has brought taxonomy down to a level very low in the estimation of the scientific world. In fact, taxonomy should be the most important science, being the synthesis of all biological sciences. Barnes and Lindsey, as followers of the out-of-date systematic school of Rebel and Meyrick, fell into many errors. Their synonymy of families and genera is full of mistakes (compare with Fletcher's synonymy of Plumes, Fletcher, 1931). That same systematic outlook, based on a superficial review of the morphology of the imagines, resulted in the faulty interpretation of some of the data available in the American literature. McDunnough (1923, 1927, 1933) was able to make some satisfactory corrections of Barnes and Lindsey's mistakes owing to his more comprehensive knowledge of ecology. The synonymy of the North American Plumes proposed by Barnes and Lindsey seems to be so unnatural that a complete revision of that material is required, especially in connexion with the geographical distribution of the species. The failure of some museum systematists to appreciate the importance of biological data has led to many errors, particularly with regard to the geographical distribution of species, and, in consequence, further research based mainly on statements in literature has led to further mistakes.

To return to the group under discussion, its division into the three genera *Oxyptilus* Zeller, *Trichoptilus* Walsingham, and *Sphenarches* Meyrick, has undergone little change right up to the present day. The number of species recognized reached 112, nearly half of them described by Meyrick (47 species exclusive of synonyms), from all parts of the world. The new genus and species *Megalorrhipida palaestinensis* described by Amsel in 1935 was synonymized as *Trichoptilus defectalis* Walker (Amsel, 1940). However, as we shall see, the generic name *Megalorrhipida* will have to be reinstated. In my note (1939) I showed the necessity of keeping the generic name *Capperia* Tutt, and I described the differences between this genus and *Oxyptilus* Zeller. But it was not correct to synonymize the genera *Capperia* Tutt and *Geina* Tutt, which differ in every respect.

3. TAXONOMY

The generic group *Oxyptilus* (sensu lato) has been divided into three genera, *Sphenarches* Meyrick, *Trichoptilus* Walsingham, and *Oxyptilus* Zeller, but a further analysis of the whole group shows that these really comprise two entirely different groups. One is represented by the two genera *Sphenarches* Meyrick and *Oxyptilus* Zeller, and the other by *Trichoptilus* Walsingham.

A part of the first group is worked out in detail in this paper. This part, except for some newly described species, contains the species formerly reckoned as belonging to the genera *Sphenarches* Meyrick and *Oxyptilus* Zeller, and distributed below between the following six genera: *Sphenarches* Meyrick, *Capperia* Tutt, *Procapperia* gen.n., *Geina* Tutt, *Oxyptilus* Zeller, and *Crombrugghia* Tutt. The species belonging to *Oxyptilus* Zeller and *Crombrugghia* Tutt have been taken into account in a general way only because all my notes and drawings relating to these species were destroyed during the war. They will be especially revised in a separate publication. Further, the species belonging to the second group (*Trichoptilus*, sensu lato) are taken into account only as material for comparison, and will also need to be worked out in detail. For the time being I have divided the second group into four genera: *Megalorrhipida* Amsel, *Trichoptilus* Walsingham, *Stangeia* Tutt, and *Buckleria* Tutt. The North American species of the second group probably belong not only to *Trichoptilus* Walsingham and *Megalorrhipida* Amsel, but also to genera not yet separately established. The detailed working out of these species is a matter for further investigations. In the present paper I use the generic and specific names in accordance with the following arrangement:

I. Genus **Sphenarches** Meyrick.
  1. *caffer* Zeller—typus generis (= *walkeri* Walsingham).
  2. *anisodactylus* Walker (= *diffusalis* Walker = *synophrys* Meyrick = ? *chroesus* Strand).
  3. *ontario* McDunnough.
  4. *zanclistes* Meyrick.

II. Genus **Geina** Tutt.
  1. *didactyla* Linnaeus—typus generis (= *brunneodactyla* Millière).
  2. *kuldschaensis* Rebel.
  3. *periscelidactyla* Fitch.
  4. *tenuidactyla* Fitch (= *nigrociliatus* Zeller = *cygnus* Barnes et Lindsey).
  5. *buscki* McDunnough.

III. Genus **Procapperia** gen.n.
  1. *maculata* Constant—typus generis.
  2. *linariae* Chrétien.
  3. *anatolica* Caradja.
  4. *croatica* sp.n.
  5. *pelecyntes* Meyrick.

IV. Genus **Capperia** Tutt.
  1. *britanniodactyla* Gregson — typus generis (= *heterodactyla* Haworth, Tutt, Meyrick, nec Müller, Villers; = *teucrii* Jordan).
  2. *celeusi* Frey (= *intercisus* Meyrick).
  3. *washbourni* sp.n.
  4. *ningoris* Walsingham.
  5. *evansi* McDunnough.
  6. *trichodactyla* Denis et Schiffermüller (= *leonuri* Stange = *affinis* Müller-Rutz).
  7. *fusca* Hofmann.
  8. *fusca* Hofmann n. forma *marrubii*.
  9. *tamsi* sp.n.
  10. *raptor* Meyrick.
  11. *hellenica* sp.n.

12. *lorana* Fuchs.
13. *marginella* Zeller.
14. *zelleri* sp.n.
15. *polonica* sp.n.
16. *maratonica* sp.n.
17. *fletcheri* sp.n.
18. *geodactyla* Fuchs.

V. Genus **Crombrugghia** Tutt.
  1. *distans* Zeller—typus generis.
  2. *laetus* Zeller.
  3. *lantoscanus* Millière.
  4. *tristis* Zeller.
  5. *kollari* Stainton.

VI. Genus **Oxyptilus** Zeller.
  1. *pilosellae* Zeller—typus generis.
  2. *ericetorum* Stainton (= *ericetorum* Zeller).
  3. *chrysodactylus* Denis et Schiffermüller (= *hieracii* Zeller).
  4. *parvidactylus* Haworth (= *obscurus* Zeller).
  5. *bohemanni* Wallengren.
  6. *delavaricus* Zeller.
  7. *hoffmannseggi* Möschler.

Of the above-mentioned species I have not seen three, namely, *geodactyla* Fuchs, *anatolica* Caradja, and *kuldschaensis* Rebel. Until I have been able to obtain material of these species I cannot with certainty give them their proper systematic position, but judging from the available information I have provisionally given them places in my scheme. For example, judging from Fuchs's description (1903) I believe that *geodactyla* belongs to *Capperia*. It is possible that *geodactyla* is a synonym of *Oxyptilus hoffmannseggi*, a very little known species recorded also from the same locality in Armenia (Caradja, 1920). Fuchs, in his description of *geodactyla*, says that this species is very similar to *celeusi* and we know how often *celeusi* is confused with *hoffmannseggi*. However, acting only on supposition, we cannot put *geodactyla* into the synonymy, the more so as Fuchs was a competent specialist in the Plume-moths.

Similarly, Rebel's description (1914) of *Oxyptilus kuldschaensis* indicates a close similarity to the very characteristic and distinct species *Geina didactyla* Linnaeus. For that reason I have put *kuldschaensis* in the genus *Geina* Tutt.

The easiest to settle was the question of *anatolica*. Amongst material from Asia Minor I found a species previously unknown to me belonging to the genus *Procapperia*. The origin of the specimens, and their agreement in some important features with Caradja's description, have induced me provisionally to determine them as *anatolica*. I have based my description on these specimens, and I hope that Caradja's type belongs to the same species.

The second part of the group *Oxyptilus* (sensu lato) is an evolutionary line closely related to the first part, which is the main theme of the present paper. This second part needs further and detailed working out, but provisionally I have arranged it in the following order:

I. Genus **Megalorrhipida** Amsel.
  1. *defectalis* Walker—typus generis.

II. Generic group **Trichoptilus** Walsingham.
  1. *pygmaeus* Walsingham—typus generis.
  2. *californicus* Walsingham.
  3. *lobidactylus* Fitch.
  4. *parvulus* Barnes and Lindsey.

III. Genus **Buckleria** Tutt.
  1. *paludum* Zeller—typus generis.
  2. *paludicola* Fletcher.

IV. Genus **Stangeia** Tutt.
  1. *siceliota* Zeller—typus generis.
  2. *xerodes* Meyrick.

V. Mixed generic group.

This group contains species whose exact generic position has not yet been determined. Amongst tropical species described as *Oxyptilus* or *Trichoptilus* there are some belonging to the genera enumerated above (except exclusively holarctic, like *Capperia, Geina, Oxyptilus,* and *Crombrugghia*), but some belong to new genera not yet described. Probably here should be placed Meyrick's *causodes* and some other Indo-Malayan and neotropical forms differing very much in their external appearance from the abovementioned genera.

I have adopted the generic names *Sphenarches* Meyrick and *Megalorrhipida* Amsel (here revived by me) as according to the Rules of Zoological Nomenclature they are available and valid, but both the genera to which I have assigned these names need redefining, as their creators had not the slightest idea of their proper scope, or of the synonymy or geographical distribution of the species belonging to them.

In connexion with the systematic review given above, attention may be drawn to the number of species in each genus. The first group, being better known, particularly in respect of the old world fauna, gives us, perhaps, figures more nearly approximated to those actually occurring in nature. It appears that older genera are more simple in morphological structure and the differences between their species are less pronounced. According to those criteria we may regard the genera *Megalorrhipida* and *Sphenarches* as the oldest, and *Capperia* and *Oxyptilus* as the youngest in the group under discussion.

4. MORPHOLOGY

The very delicate structure of the Alucitidae makes them difficult to preserve in good, undamaged condition, and the material in the several collections which I used for my work was in great part more or less worn, and sometimes even too bad for determination by external appearance only. The species with which we are here concerned are so similar to one another that external appearance is often insufficient for accurate determination. Some of them, as, for example, *Capperia celeusi* Frey or *Oxyptilus parvidactylus* Haworth, appear in various forms, sometimes resembling other species. These forms are not sufficiently differentiated to be considered as separate species. Lack of material prevented me from deciding if they were geographical or ecological forms and I found myself quite unable to work out a key for the determination of the species by external appearance. Such work would be possible if we could collect long series of unblemished bred specimens from various localities for the purpose of studying the mutability of species and their sexual and seasonal dimorphism. In view of the difficulties with which I was confronted I was compelled to take into account in my descriptions the external appearance of species to a limited extent only. My classification is therefore based mainly on the morphology of the copulatory apparatus, supported in addition by ecological data. External appearance in the present group is very misleading, and I found myself obliged to describe several new forms, in spite of the existence of many old synonyms. For documentary reasons I have cited old published determinations based on external appearance only. The great number of the mistakes in determination is characteristic of this difficult group.

During my examination of the copulatory apparatus I have especially taken note of the degree of sclerotization as well as the degree of specialization of its structure as a whole or in its parts. The following types of structure in the male copulatory apparatus are distinguishable:

Ninth segment.

1. Slightly differentiated into parts. Tergum clearly joined with sternum by the pleurae (*Megalorrhipida*).
2. Distinctly differentiated into separate parts. Tergum not specialized, sternum slightly specialized (*Sphenarches, Procapperia*).
3. Distinctly differentiated. Tergum not specialized, sternum strongly specialized (*Capperia, Geina*).
4. Distinctly differentiated. Tergum strongly specialized, sternum very weakly developed (*Oxyptilus, Crombrugghia*).

Valva.

1. Not specialized, flap-like, unarmed (*Sphenarches, Megalorrhipida*).
2. Little specialized, differentiated into basal and distal parts, unarmed (*Procapperia, Geina*).
3. Very specialized, weakly sclerotized, armed (*Oxyptilus, Crombrugghia*).
4. Very specialized, strongly sclerotized, elaborately armed (*Capperia*).

Aedeagus.

1. Not specialized, tube-like, faintly sclerotized, slightly curved, not armed (*Megalorrhipida, Sphenarches*).
2. Little specialized, basal part more developed, tube-like, slightly curved, not armed (*Geina, Oxyptilus*).
3. More specialized, strongly curved, strongly sclerotized, not armed (*Procapperia*).
4. Very specialized, very strongly curved, very strongly sclerotized, armed (sometimes asymmetrically) (*Capperia*).

Analysing the results we can arrange the above-mentioned genera according to the specialization of their genitalia in the following order: *Megalorrhipida*, *Sphenarches*, *Procapperia*, *Geina*, *Crombrugghia*, *Oxyptilus*, *Capperia* (putting *Sphenarches* in the second place because it has a more strongly developed uncus than *Megalorrhipida*). Similarly, as in the preceding paragraph I place *Megalorrhipida* and *Sphenarches* at the beginning of the scale, and at the end *Oxyptilus* and *Capperia*.

A study of the wing colour and pattern gives us the following grouping:

1. Weak pigmentation, wings coloured yellow or light brown (*Sphenarches, Megalorrhipida*).
2. Pigmentation a little stronger, wings coloured dark yellow with transitions to rusty, brownish, or greyish tints (*Procapperia, Crombrugghia*).
3. Pigmentation very strong, wings coloured light brown, rusty to dark brown, with reddish, greyish, or blackish tints (*Oxyptilus, Capperia*).

Ranging the genera in accordance with their degree of pigmentation one arrives at the same order as before.

The American entomologist Braun (1914) studied the phylogeny of the genus *Lithocolletis* (Lepidoptera) and drew a phylogenetic tree of this genus composed of five branches representing differently coloured species. According to the plates given by her the oldest, ancestral form was coloured light yellow, but the oldest recent forms are dark yellow. Young recent forms vary from yellow to dark brown and grey, younger forms are dark yellow or light brown, and the youngest are brown only.

The result of my own studies on the Alucitidae are similar, i.e. the older evolutionary lines exhibit faint pigmentation, and during their evolution they become more and more pigmented and the wing-colour gradually changes from yellow, through rusty, reddish, greyish, to dark brown.

I have not made an exhaustive study of the wing-venation in the *Oxyptilus* group, but I have compared the drawings given by Amsel (1935) of *Megalorrhipida* and by Barnes and Lindsey (1921) of *Trichoptilus*. According to these authors *Trichoptilus* has a more complex venation than *Megalorrhipida*, which has fewer nervures. I do not feel that the drawings are quite accurate. The structure exhibited by *Megalorrhipida* is very primitive and ancestral compared with that displayed in *Trichoptilus*, a state of affairs to be seen similarly in the genus *Sphenarches*, which is ancestral to *Capperia*. The evolutionary tendency towards reduction of wing-surface in the Plume-moths is familiar, and it is clear that there is at the same time a reduction in the number of veins. As the derived form cannot have more veins than the ancestral, I conclude that the drawings I have mentioned above leave room for some doubt as to their correctness.

The reduction of wing-surface is also to be observed in the group *Oxyptilus* (sensu lato) if one compares the hind angle of the primaries of the different genera. The evolutionary older forms like *Sphenarches* or *Geina* have this hind angle very distinct, but in the younger genera it is gradually disappearing, e.g. very slight in *Oxyptilus*, scarcely visible in *Capperia*.

The analysis of pattern and maculation of the wings would also probably show the trend of evolutionary lines in the group *Oxyptilus* (sensu lato). Unfortunately I had not before me sufficiently fresh specimens to make adequate studies of these features.

The degree of specialization of several external morphological features ranges the genera of the group in an order similar to that arrived at by a study of the male genitalia; the majority of the primitive features characterize the genera *Sphenarches* and *Megalorrhipida*. In consequence these two genera are very closely related. Most probably they are both derived from a not too distant common ancestor. However, in spite of their close relationship, these two genera belong to two distinct evolutionary lines. One of them leads to *Procapperia*, *Geina*, *Capperia*, *Oxyptilus*, and *Crombrugghia*, the other one (i.e. *Megalorrhipida*) to *Trichoptilus*, *Buckleria*, and *Stangeia*. It is interesting to see in both lines parallel directions of evolution, and a certain amount of similarity exists not only in the simplest but in the more specialized forms. For example, representatives of both the lines mentioned, *Buckleria* and *Oxyptilus*, have similar segmentation of the valva (vide plates of Hofmann, 1896). Also the genera *Capperia* and *Stangeia* have the aedeagus transformed into a very strongly sclerotized organ, armed with asymmetrical processes. In connexion with these remarks on evolution one must take into consideration that they concern the relationship of the structures of recent living forms belonging to different genera, and the occurrence of similarity between two genera cannot be taken as proof of the derivation of these genera from one another. Nevertheless I think it happens sometimes.

I realize that it would be easy to call in question my evaluation of the grade of evolution based on a simple macroscopic review of morphological features. Doubtless it would be very useful to have genetically known material for investigation of the histology and the last stadium of development in the pupa. With such material it should be easy (in accordance with biogenetic laws) to find evidence in support of my ideas of the phylogenesis of the group under discussion. Without ontogenetic investigations it is really difficult sometimes to decide whether a particular feature is retrogressive or progressive, and which form is more specialized or more primitive. However, as I have no opportunities for such investigations, I shall do my best in the following sections to adduce further evidence in support of my ideas about evolutionary trends in the group *Oxyptilus*.

5. ECOLOGY

We have few ecological particulars relating to this interesting group. On the basis of my own observations on the ecology of certain palaearctic species I am able to interpret certain other published ecological data relating to the *Oxyptilus* group. I have found, further, some interesting observations published under wrongly used names, and many that need to be verified by field observations. Some biological particulars have been published by American entomologists. Barnes and Lindsey (1921) revised the North American Alucitidae (under the name Pterophoridae), basing their work on the morphology of the imagines. They failed to take care to relate the synonymy to the available ecological data, scanty as the valid information on nearctic plumes unfortunately is. Tropical species are the least known from the ecological point of view, for we know so few life-histories.

In the group under review there exist very dissimilar grades of specialization of species and genera in the selection of food-plants. Our knowledge in this matter is as follows:

The genus *Capperia* is the most specialized. All the known food-plants of the species belong solely to the Labiatae, which is one of the most highly developed groups of plants (Hutchinson, 1926). Separate species of the genus *Capperia* often feed on different but closely related species of plants, as, for example, *C. britanniodactyla* on *Teucrium scorodonia*, *C. celeusi* on *T. chamaedrys*, and *C. polonica* on a so far undetermined species of *Teucrium* of the *chamaedrys* group. Monophagy is a prominent feature of this genus. I carried out some experiments with larvae of *C. fusca* feeding on *Stachys alpina*. I gave them the very similar plant *Stachys sylvatica*, but they all died of starvation, refusing to touch it. Similarly, larvae of *C. trichodactyla* transferred from their food-plant *Leonurus cardiaca* to *Ballota nigra* refused to touch it.

The genera *Oxyptilus* and *Crombrugghia* are limited to the Compositae, but at least some of the species belonging to these genera are oligophagous. *Crombrugghia distans* has been recorded from *Crepis tectorum*, *C. virens*, and *Picris hieracioides*, all Compositae closely related to each other. *Oxyptilus parvidactylus* has been recorded as feeding on *Hieracium pilosellae* and *H. laevigatum* (Tutt, 1907). Other plants such as *Marrubium*, *Stachys*, and *Thymus* have been erroneously recorded for *O. parvidactylus*.

The Compositae are an intensively developed group high on the phylogenetic tree of plants (Hutchinson, 1926), and contain many poorly differentiated and often intercrossing forms, as, for example, species of *Hieracium*. There is some correlation in the wide variability of Compositae-feeding Plume-moths of the genera mentioned above. For example, the species *parvidactylus* and *distans* are both very variable in size and colour.

The genus *Geina* is less specialized in the selection of food. Species of this genus feed on plants belonging to Rosaceae and Ampelideae like *Geum*, *Potentilla*, *Rubus*, and *Vitis*. According to Hutchinson (1926) both these families are less developed than the Labiatae. The *Geina* species are not monophagous and they can thrive on some nearly related species of plants belonging to Rosaceae or Ampelideae. I discovered larvae of *Geina didactyla* on *Geum rivale*, *Geum urbanum*, and *Potentilla rupestris*. When I changed the larvae from any one of the three mentioned plants to another, they survived the change very well. Hofmann (1896) and Schütze (1931) cited also *Leonurus cardiaca* and *Veronica officinalis* as food-plants of *didactyla*, but these are manifestly incorrect data. I tried these plants as food for larvae of *didactyla*, but they would not touch them and they died of starvation.

We know only three species of food-plants for the genus *Procapperia*. These are *Scutellaria demnatensis* for the African *Procapperia linariae* (Powell, 1922), *Scutellaria discolor* for the Indian *P. pelecyntes* (Fletcher, 1921), and *Scutellaria alpina* for the European *P. maculata* (Chrétien, 1922). As far as we at present know the larvae of *Procapperia* species live only on Labiatae, but data relating to this genus are few and incomplete.

The genus *Sphenarches* is perhaps the least specialized as regards the selection of food-plants, the larvae being markedly polyphagous. The following food-plants have been recorded for *Sphenarches anisodactylus* (but under the name *Sphenarches caffer*—see Systematic Revision): *Lagenaria vulgaris* (calabash), *Luffa* sp. (Cucurbitaceae), *Dolichos lablab*, *Cajanus indicus*, *Mimosa pudica* (Leguminosae), *Averrhoa bilimbi*, *Biophytum sensitivum* (Geraniaceae), *Hibiscus mutabilis* (Malvaceae) (see Fletcher, 1920, 1921). Hori (1931) cited also *Phaseolus vulgaris* (Leguminosae). Thus *S. anisodactylus* is a polyphagous insect feeding on at least nine species of plants belonging to four different families, none of which is a top group in the evolutionary tree given by Hutchinson (1926); in fact Cucurbitaceae and Leguminosae belong among the more primitive flowering plants. As for food-plants belonging to other genera, the data are not sufficient to make comparisons possible.

Analysing the above-mentioned families, we are able to distinguish among them the three following groups:

1. Primitively organized flowering plants (Cucurbitaceae).
2. More highly organized plants, groups comparatively young with many not very distinct species (Rosaceae, Compositae).
3. Very highly organized older forms having specific features very distinct (Labiatae).

Having regard to their food-plants, we can divide the species discussed above as follows:

1. Polyphagous, feeding on many different species of plants not necessarily even related to each other.

2. Oligophagous, feeding on a few species of nearly related plants.
3. Monophagous, feeding exclusively on one single species of plant.

Analogically we can divide the genera of the insects. For example, the genus *Capperia*, living only on one family Labiatae, we can call a 'monophagous genus'.

Summarizing the data discussed above we characterize the genera included in *Oxyptilus* (sensu lato) as belonging to four groups:

1. The most primitive, containing the polyphagous species (*Sphenarches*).
2. A little more specialized, containing the oligophagous species, living on a few families of plants (*Geina*).
3. Yet more specialized, containing the oligophagous species living on one family of plants only (*Oxyptilus, Crombrugghia*).
4. The most specialized, containing the monophagous species (*Capperia* and probably *Procapperia*).

From this division the following points emerge. The genus *Sphenarches*, which we regard as the least specialized morphologically, possesses also the most primitive habit of polyphagy. With increasing morphological specialization this primitive habit became more and more restricted, until ultimately the most morphologically specialized 'monophagous' genus *Capperia* contains the monophagous species only, all living on closely related species of plants of one family.

As a result of this study another significant fact emerges. The forms of the group under discussion, while passing from polyphagy to monophagy (and becoming more and more phylogenetically old), at the same time change primitive food-plants for more and more specialized (phylogenetically older) forms of food-plants.

The number of generations produced during the season provides also a very important indication of the extent of the phylogenetic evolution of the group. There is little useful information on this subject. From my own observations and judging from the verifiable data extracted from the literature, I am able to state that the species belonging to *Capperia* produce two generations a year (*fusca, celeusi, trichodactyla, britanniodactyla, lorana*). In the genus *Crombrugghia* two generations are produced (*distans, tristis*), and I think it is also probable that two generations are produced in the genus *Procapperia* (judging from the appearance of fresh specimens of *maculata* and *linariae* taken in August). The species of *Oxyptilus* appear in one generation (*pilosellae, parvidactylus, ericetorum, chrysodactylus*). Likewise in the genus *Geina*, the only European species, *didactyla*, appears in a single generation. All these data relate to forms living in a temperate climate. The length of the period of development of a single generation and the number of generations during a season appear to be correlated with the degree of specialization of the forms in question. In the case of an increased number of generations greater efficiency and a speeding up of the ontogenetic process is indicated. In other words, the more specialized forms multiply more efficiently and at a greater rate. From the data I have given relating to the above-mentioned genera I conclude that *Capperia* and *Procapperia* are further advanced in their evolution than *Geina*, and *Crombrugghia* should be regarded as a more specialized evolutionary line than *Oxyptilus*.

It is commonly recognized that the number of generations depends upon the climatic conditions. Of this there is no doubt, but that does not explain the whole question.

In warmer countries as the season of vegetation becomes longer, the number of generations increases; but the number of generations is not the most important thing. More important is the length of time taken in the development of one generation—the speed of its development.

The two generations of *Capperia* and *Crombrugghia*, in Europe, are not to be explained by their geographical distribution extending farther to the south than that of *Oxyptilus* and *Geina*, which have one generation only. On the contrary, in some cases these double-brooded genera live in a much colder climate than single-brooded genera, but they do not lose their bivoltine characteristics. For example, *Capperia fusca*, even when living in very high and cold places in the Alps or in the Tatra mountains, produces the same two generations that it does in much lower warmer spots. *Capperia trichodactyla* in north Poland has two generations as in south Poland. *Geina didactyla* is unable to produce a second generation because it occurs on *Geum rivale* grown in shady humid alder woods, but even when it occurs in very sunny warm places on *Potentilla rupestris* and emerges a few weeks sooner, it still fails to produce more than one generation. *Oxyptilus chrysodactylus*, like other species of this genus, produces one generation in July–August even in south Europe (the numerous data in the literature concerning this species under the name *hieracii* are sometimes erroneous). It seems that the number of generations depends rather more on specialization of a species and on its phylogenetic development than on climatic conditions.

6. GEOGRAPHICAL DISTRIBUTION

The first group of genera is much better known systematically and one can thus fairly accurately define its geographical distribution. It is very characteristic for each genus. In the genus *Sphenarches* there are known four species only: South African, *S. caffer* (Natal, Caffraria); North American, *S. ontario* (Canada); Burmese, *S. zanclistes* (mountains in Central Burma, 21° N. lat.); and *S. anisodactylus* with an extremely interesting distribution. This species lives only in tropical countries, from which it has been recorded under various names. It has a very wide distribution. Following careful studies of the genitalia I have been able to verify the occurrence of *anisodactylus* in the following countries: Peru, West Indies, West Africa, Madagascar, India, Ceylon, eastern Australia, New Hebrides. In addition, I have very little doubt that many of the records made under the name *Sphenarches caffer* refer to *S. anisodactylus*, particularly those from the following countries: Brazil, French Guiana, Central Africa, East Africa, Mauritius, Maldive Is., Burma, Sumatra, Java, Philippines, Japan, China, New Guinea, Tenimber, Tonga, Samoa. The same widely distributed species known formerly under the name *caffer* was also recorded from extra-tropical countries like Palestine and South Africa, but these records do not refer to *anisodactylus* but to other species (true *caffer* and *Capperia maratonica*). A revision is required of the records from China (30° N.) and Japan (Hering, 32° N.; Hori, 31°–46° N.) given by Hering (1903), Hori (1931), and Caradja and Meyrick (1935). The drawings of male genitalia given by Hori (1931) under the name *caffer* confirm the occurrence of *anisodactylus* in Japan; at the same time, however, his records from north Japan (46° N.) are very doubtful. According to Meyrick (1927) this species (termed by him *caffer*) is probably distributed throughout all the tropical countries of the world. Its presence on very isolated Pacific islands is explained by Meyrick as the result of human activity, i.e. as a species introduced with cultivated plants. Even if this happened on some Pacific islands, it is not a sufficient explanation for the presence of this species in many other tropical countries very isolated from each other. Probably further physiographical investigations will disclose the presence of *anisodactylus* on quite isolated spots having no imported cultivated plants at all. It is very interesting that this very common polyphagous species is at present unknown in Hawaii and in New Zealand where the fauna has been carefully studied. Both are fairly large countries which have been intensively cultivated for a long time, and into which numerous species of animals and plants have been especially introduced for acclimatization; however, *anisodactylus* does not occur in either.

There are known five species in the holarctic genus *Geina*. Three of them are North American, one European reaching western Asiatic countries, and one known only from Asia (Tian-Shan Mts.). This genus is widely distributed northwards in both hemispheres, alike in Europe and in the United States and Canada. *Geina didactyla* is a commonly distributed species in middle and north European countries. Westwards it reaches France and eastwards the Balkan states (Bulgaria) and Asia Minor. It is very peculiar that *didactyla* does not occur in the British Isles although its food-plants commonly grow there. *G. didactyla* should be much more widely distributed eastwards in north-west Asia, but we have as yet no data from there.

The genus *Procapperia* is represented by Mediterranean and Indo-Malayan species. Four Mediterranean species are known from Morocco (*linariae*), southern France (*maculata*), Croatia (*croatica*), and Asia Minor (*anatolica*). One species lives in Ceylon (*pelecyntes*). Most probably some other Indo-Malayan species of *Oxyptilus* (sensu lato) belong also to *Procapperia*.

The genus *Capperia* is holarctic like *Geina*, but is distributed more to the south than *Geina*. Out of seventeen known species only two are American, viz. *ningoris* from the middle and south of the United States and *evansi* from south Canada. The remaining fifteen species are distributed in western and middle Europe and in the European and Asiatic parts of the Mediterranean area. In this area the species of *Capperia* live very locally and only a few are more widely distributed. No species are known from North Africa. The northern limit of distribution of the genus *Capperia* in the eastern hemisphere approximately coincides with the southern limits of the Pleistocene glaciation. This line is crossed here and there by *Capperia trichodactyla* wandering along the rivers Vistula and Oder from southern Poland northwards. In North America *C. ningoris* shows a similar distribution in the south and middle United States southwards from the limit of glaciation. Along the warm shores of the Pacific only does this species extend farther northwards and reach British Columbia (Blackmore, 1922). Quite an exception in the genus is the second American species, *evansi*, which has wandered as far as southern Canada. *Capperia britanniodactyla* is distributed in England, Belgium, and in the Rhine valley. The northern and middle parts of the British Isles were glaciated, leaving south and parts of central England only free of glaciation (Zeuner, 1945). The distribution of *Capperia britanniodactyla* in England accords almost exactly with these limits. The European and Asiatic species of the genus *Capperia* are distributed as follows:

1. West European group, containing two species: *britanniodactyla* (England, Belgium, Rhineland) and *lorana* (Rhineland).
2. Central European group, containing three species: *celeusi* (Hungary, Croatia, Serbia, south Poland, Alps, Bavaria, Thuringia, French Pyrenees); *trichodactyla* (Poland, Germany, Austria, Switzerland); *fusca* (south Poland, Switzerland, north-east France, Croatia, Greece).
3. Euro-Asiatic group, containing three species: *hellenica* (south France, Italy, Yugoslavia, Greece, Asia Minor); *tamsi* (Spain, Asia Minor, Syria); *maratonica* (Yugoslavia, Greece, Palestine).
4. Mediterranean, insular group, containing three species: *polonica* (Sardinia, Prince Is.); *zelleri* (Sicily); *marginella* (Sicily).
5. Asiatic group, containing three species: *washbourni* (Asia Minor, Syria, Palestine); *fletcheri* (Palestine); *geodactyla* (Armenia).

Thus two species only live in the northern part of west Europe, in middle Europe three, in south Europe six, and in east Mediterranean countries seven. The number of species of *Capperia* increases towards the south-east; southwards the distribution area of this genus ends on to the Mediterranean islands, but no species is found or recorded from African shores. There are no records from countries lying farther eastwards in Asia like Persia or Turkestan.

The genus *Oxyptilus* is holarctic like the preceding. It contains seven species. The only North American species (*delawaricus*) is very widely distributed in the United States and Canada. The other six species live mostly in colder climates in central and north Europe, but some are more widely distributed and reach the Mediterranean countries (*chrysodactylus*, *hoffmannseggi*). One living only in northern colder countries is the Scandinavian *bohemanni*. Of those widely distributed in Europe two are absent from the British Isles, *chrysodactylus* and *ericetorum*. The absence of these two species is very interesting. It is not a matter of climate or food-plants; the riddle must be solved in another way. The genus is distributed farther eastwards than the last. According to Meyrick's data (1913), not verified by me, some species reach Transcaspia (*pilosellae*), Caucasus (*ericetorum*), west Siberia, and Persia (*parvidactylus*).

The genus *Crombrugghia* is exclusively palaearctic, but its distribution is more southerly than that of *Oxyptilus*. In this genus there is no species confined to the northern countries. The most northern species is the middle European *tristis*. But there is one purely alpine species (*kollari*). Two species are Mediterranean only, *lantoscanus* (south France) and *laetus* (south Europe, Asia Minor, north Africa, Canary Is.). The third south European species, *distans*, is distributed more widely northward. It reaches the southern parts of central Europe and the British Isles. This is the only British species in this genus.

Insufficient systematic work has been done on the second group of genera to produce more than an outline.

The genus *Megalorrhipida* represents a group analogous to *Sphenarches* because it is very widely distributed in the tropics, but, corresponding with its somewhat more primitive morphological structure, its geographical distribution is also wider than the distribution of *Sphenarches*. The genus *Megalorrhipida* reaches eastwards to Hawaii. It is also more widely distributed northwards in Asia (China, Palestine). In North America *Megalorrhipida* reaches to the south of the United States. In New Zealand it is absent, like *Sphenarches*. The generic type is *defectalis*, which has several synonyms (Fletcher, 1931), having been described under various names from many countries. All these synonyms should be verified by comparison of the genitalia; however, one can say that *defectalis* is very widely distributed all over the world. Drawings of the male genitalia of this species were published by Amsel (1935) and Barnes and Lindsey (1921). Although the drawings show different aspects it seems they are of the same species, living alike in the United States and in Palestine. On the basis of ascertained synonymy one can provisionally call this species *defectalis* Walker, supposing it to be the same species as that described by Walker from the African tropics.

Two representatives of the genus *Stangeia* are known, the Mediterranean *siceliota* and *xerodes*, living in India and Ceylon. *S. xerodes* is also recorded from New Guinea, Australia, Africa, and Palestine. I cannot distinguish from *siceliota* the Palestine specimen named *xerodes* by Meyrick. The Australian specimens of *xerodes* I saw in the British Museum seem to be a species different from the Indian *xerodes*. This genus should be carefully revised.

The genus *Buckleria* differs strongly in the structure of the genitalia from *Stangeia*, but its distribution is very similar. Two species are known, a central European one occurring also in Great Britain (*paludum*), and *paludicola* distributed in India and Ceylon. In the British Museum *paludicola* has been considered as a synonym of *paludum*.

The generic group *Trichoptilus* contains exclusively North American species. They belong probably to several distinct genera, not yet separated. It seems that these North American species represent evolutionary lines quite distinct from those of the European species. They differ morphologically too, and cannot be put together in the same genus *Trichoptilus* with the Old World's lines *Stangeia* and *Buckleria*.

This review of geographical distribution shows that the genera can be placed in the same succession as was obtained from a comparison of their morphology or ecology. The order depends upon such characters of distribution as space and climate as follows:

1. Genera and species most widely distributed all over the world are also the most primitive in their structure and ecological features (*Sphenarches, Megalorrhipida*).
2. Less widely distributed forms are more specialized (*Geina, Procapperia, Oxyptilus*).
3. Units most limited in distribution are most specialized (*Crombrugghia, Capperia*).

There are also some connexions with climate:

1. Most constant characters, not changing over very wide areas, exist in tropical genera. They contain very few species and seem to be arrested in their evolution (*Sphenarches, Megalorrhipida*).
2. More often differentiating characters are found in genera passing northwards to a colder climate. These genera contain more species (*Procapperia*).
3. The greatest variability of characters changing over small areas and therefore genera richest

in species are seen in the most far northward countries (*Capperia, Oxyptilus*). In these genera there are the biggest tendencies for the formation of new species (vide the variability of *celeusi* and *parvidactylus*), and it indicates the bigger expansion of life in cooler climates independently of the phylogenetical lifetime of the forms in question.

The above-mentioned connexions can be seen by comparing genera standing very close to each other such as *Capperia* and *Procapperia* or *Oxyptilus* and *Crombrugghia*. Besides, it is known that some genera are more common and numerous in species in the north (*Geina, Oxyptilus*), and on the contrary other genera are more common in the south (*Capperia, Crombrugghia*). In connexion with this fact one can observe the northern limit of distribution for southern genera (i.e. southern limit of Pleistocene glaciations), but there does not exist any southern limit for northern genera. These northern genera are only more and more rare southwards, but they are distributed as far to the south as the southern genera, and both groups of genera reach the same geographical barriers in the south.

A general glance at the geographical distribution of the group discussed shows where the evolutionary lines are most frequent. Thus, in the northern hemisphere there exist more genera and species than in the southern hemisphere. Similarly more forms are known from the eastern hemisphere than from the western. Thus it appears that in the northern and eastern neighbourhood of the Mediterranean basin several evolutionary lines are the most frequent. Unfortunately there is not sufficient material from western Asiatic countries to determine the position of the centre of this concentration of evolutionary lines. However, one assumes this centre to be in the area of the countries of the Middle East.

7. PHYLOGENY

In the preceding sections data concerning the morphology, ecology, and geographical distribution of the group *Oxyptilus* (sensu lato) have been discussed. The relation of this information to questions concerning the age and origin of our group may now be considered.

In connexion with problems of the geographical distribution of various groups of animals numerous theories have been advanced as more or less hypothetical solutions. But even the theories of hologenetic evolution, and of old bridges between ancient continents, do not fully explain all the questions of animal geography.

The most synthetic and also the most revolutionary attempt to reproduce the history of our globe resulted in the theory of continental drift (Taylor, 1910; Wegener, 1912, 1924, 1937). For a long time this theory was severely criticized. However, its wide usefulness in many branches of natural sciences attracted the attention of several scientists. Of recent years there have appeared several important works, in particular those of Du Toit, Jeannel, Zeuner, and others, which have strengthened the theory of continental drift in the scientific world.

Below is set out an attempt to explain the geographical distribution of the group *Oxyptilus* (sensu lato) on the basis of Wegener's theory. It may be a useful contribution both to entomological studies and to a further investigation of the Taylor–Wegener theory.

According to palaeontological data the first appearance and the beginning of the evolution of the Lepidoptera occur in the middle of the Jurassic. About that time appear the first flowering plants. The Lepidoptera of that time belonged to the most primitive and now extinct group Palaeontinidae. The intensive development of Lepidoptera started with the beginning of the Cretaceous simultaneously with the progress of flowering plants (Angiospermae). By that time the differentiation of Lepidoptera had so far advanced that the first representatives of some families existing at present can be found. The very strong development of Angiospermae in the second half of the Cretaceous justifies the assumption that at that time the immediate ancestors of recent generic groups in Lepidoptera appeared. Among Alucitidae one can suppose the existence of the ancestral form from which all these groups having a patch of scales on their secondaries originated (*Platyptilia*, *Oxyptilus–Trichoptilus* group). Unfortunately the very delicate structure of the Plume-moths did not allow their preservation as fossils. Therefore we are forced in this group to study its palaeontology without fossils. This is very difficult, but we find some very important hints in the geographical distribution of recent forms. The genera *Megalorrhipida* and *Sphenarches* occur over the whole area of the tropics of our globe. Their common ancestor (probably common for *Platyptilia* too) probably initiated the development of the genera mentioned, still in the Cretaceous, somewhere on the Lemuria–Angara continent. In this way could be explained the distribution of these genera in the tropics of both hemispheres, that is, over the Euro-Asiatic (Angara) and Indo-African continents in the east and in the tropical parts of American continents (Archigalenis and Archiguiana) in the west, before these continents became separated by seas. As we see on the maps of Köppen and Wegener (reproduced also by Jeannel, 1942) the recent areas of northern Brazil and of Malaya were continents since the Mesozoic and since that time have not changed their tropical climate. But, on the other hand, their junction by land in the tropical area, that is, the junction of the tropical continents of the western hemisphere with the Angara continent, existed only on the break of the Mesozoic and Tertiary, in the period of Montien when the Indo-African continent was separated already from Angara. Then, in the Montien, the tropical genera *Sphenarches* and *Megalorrhipida* passed westwards to the tropical areas of North, South, and central America which were united with the West Indian islands at this time. The climatic conditions of those times did not allow these tropical genera to extend their distribution towards the Australian–New Zealand continent by the southern route through the continents of South America (Archiplata), Palaeoantarctis, and Australia. Only the ancestor of the genus *Platyptilia*, not attached particularly to a tropical climate, passed by this way from Archiplata to Australia and New Zealand along the sea-shores of Palaeoantarctis which had during the Montien a moderate climate. In subsequent periods this migration route was interrupted by the cooling of the climate (Eocene), by sea transgression separating the Australian continent, and by definite separation of New Zealand from Australia (Oligocene). The contact of the Australian continent with south-east Asiatic areas took place much later (Pliocene) and only then could the genera in question pass to Australia, but not to New Zealand, which was already completely isolated. In this way one can explain the presence of only the genera *Sphenarches* and *Megalorrhipida* in the tropics of South America, the West Indian islands, Malaya, and Australia from the end of the Cretaceous until the middle of the Tertiary. At that time the greater part of the African continent, with Madagascar and India with Ceylon, had a very cool climate and only the northern part of the Indo-African continent (Egeida Meridionalis) extending very far to the north had a tropical climate. During this period the thermophilous forms could not pass to Ceylon nor to Madagascar because of the proximity of the polar circle and a very severe climate. In warmer, more equatorial African areas, having a moderate climate during the Eocene, the species *Sphenarches caffer* was differentiated. It could not pass to Madagascar because this island was completely isolated from the African continent. The temporary contact of Madagascar with the continent happened much later, at the end of the Miocene, but in the meantime, since the Eocene, the Equator moved very far southwards and *Sphenarches caffer*, adapted to a cooler climate, moved also to South Africa and could not use this north Malgash bridge. However, this tropical bridge was very useful for the tropical species *Sphenarches anisodactylus* to enter this island. It passed also to India and to Ceylon, then united with India. The North American species of *Sphenarches* arose from a line isolated after the Montien in Archigalenis, the climate of which during the Tertiary became more and more cool. By Pliocene times the climatic conditions there were like those of to-day. At the end of the Tertiary, when central America emerged and the route to South America was open anew, this North American *Sphenarches* was already too much changed and adapted to a cooler climate to use the connexion.

The distribution of these genera in the Pacific area is a separate problem. The genus *Sphenarches* reaches in this area New Hebrides, Tonga, and Samoa, but *Megalorrhipida* is known even from Hawaii. The fauna of the Hawaiian islands is well known and it seems unlikely that a common polyphagous genus like *Sphenarches* should have been overlooked. Wegener's maps suggest that the Pacific islands, or at least a part of them, were united with the Malayan area in the Montien. Jeannel (1942) states that the Hawaiian islands had never a connexion with the American continent. One can suppose, therefore, that Hawaii was the first to be isolated from the Angara–Lemuria continent (which could not happen before the end of the Cretaceous), before the appearance of *Sphenarches* on the east shores of that continent. The isolation of Samoa and Tonga, being nearer to the continent, should have taken place later, after the appearance of *Sphenarches* in this area. These differences in the distribution of *Sphenarches* and *Megalorrhipida* seem to show that *Megalorrhipida* is an older line than *Sphenarches* and also that the centre of evolution of this group was on the Angara continent (Eurasia).

Sphenarches anisodactylus presents an unusually interesting phenomenon in this genus. From a comparison of the male copulatory apparatus from several localities I ascertained that this species occurs in the tropical countries of both hemispheres. In this case the lines of the New and Old Worlds of this species must have been isolated from each other since the times of Montien, i.e. for about sixty million years (Zeuner, 1946) or, one can also say, during more than sixty million generations (dependent upon the number of generations a year). It is difficult to suppose that the species endured such a long time without change. On the other hand, it would be even more difficult to accept the hypothesis that in several areas very remote from each other and very well isolated the same species could suffer identical changes by identical evolutionary processes producing the same final results during such a long time. Zeuner (1935) reckoned the time needed for the development of a new species in certain mammals to be about 500,000 years, i.e. about 25,000 generations. But evolutionary processes do not always move at such a rate and sometimes they seem even to stop for a very long time. For instance, recent species of insects are known in Oligocene ambers which are about 40 million years old. This fact makes easier the supposition that *Sphenarches anisodactylus* endured in the tropics for 60 million years without changes. It seems that the range of time and number of generations necessary for the speciation of a new animal species varies within wide limits. It is possible also that in spite of Zeuner's (1943) opinion the factor of time does not play a decisive part in this matter and evolution of a new species depends more on other factors than on time and the number of generations. It seems that time, even very long, does not act as a factor of importance when climatic changes fail, and on the contrary, a very short time span in the presence of climatic changes causes intensive evolutionary effects, as one sees on comparing recent British and continental insects living in areas which have been separated only a few thousand years. If it is admitted that *Sphenarches anisodactylus* endured without changes since the period of Montien (and there seems no other possibility), the consequences of this assumption must also be admitted. On this admission *Sphenarches anisodactylus* is a living ancestral form of the closely related species having narrower distribution like the South African *caffer* or North American *ontario*, and, further, *anisodactylus* is the living ancestor of certain descended genera which will be discussed below.

An analogous case is afforded by *Megalorrhipida defectalis*, which is probably the ancestral form for the *Trichoptilus* group, if, of course, further investigations confirm the facts about its distribution as at present known. This is a still older form, as shown by its wider distribution (Hawaii), simpler structure (uncus, valva), and greater elasticity in climatic adaptation, and also its presence outside the tropics. The similarity of the genitalia of the two genera suggests the possibility that *Megalorrhipida* is ancestral to *Sphenarches*. However, the structure of the primaries (second lobe) does not agree with such a supposition. Studies on the ontogenetic development of these forms could be of decisive value in this case.

During the Tertiary the above-mentioned ancestral forms gave rise to several new evolutionary lines which since then have become specialized as distinct, recent genera. These genera are more or less close to *Sphenarches* or *Megalorrhipida*, but they are more specialized and they are much more limited in their geographical distribution. Let us see first which forms seem to derive from *Sphenarches*. The line morphologically very close to *Sphenarches* is represented by the genus *Procapperia*. Its recent Indo-Mediterranean distribution indicates that *Procapperia* dates from the times of Montien when the territories of Indo-Africa and Egeida Meridionalis were joined together as one continent, separated by the sea of Tethys from the shores of Eurasia. The Eocene marine transgressions divided this continent into three parts having different climates, and consequently correlated groups of species should have become differentiated, namely, the Mediterranean, Indian, and probably the African group.

The last has not been discovered so far, but may exist in the African tropics. The Mediterranean group being under the influence of climatic changes in Pleistocene times, began to differentiate as the latest and therefore the species of this group are still very 'young' and morphologically not very well stabilized.

The genus *Capperia* dates from the European tropics of the Eocene, when the direct contact with the tropics of the New World was already interrupted. Europe at that time was an area subjected to marine transgressions and divided into several islands, of which the largest were Tyrrhenis and Egeida Septentrionalis. This insular character provided particularly convenient conditions for the separation of new forms. Morphologically three groups are recognizable in the genus *Capperia*, which were differentiated during the first half of the Tertiary. The most primitive group has an unarmed aedeagus (type: *hellenica*). It occurs in south Europe only. It is the closest group to *Procapperia*. In addition to it there exist two groups with a more complicated aedeagus structure. The more northern has the aedeagus with symmetrical processi (type: *celeusi*), the southern has asymmetrical processi on the aedeagus (type: *fletcheri*). During the Oligocene the more northerly group (symmetrical aedeagus) passed to North America by the northern Atlantic bridge lying in a moderate climate, and gave rise to the two *Capperia* species now living in North America and belonging to the *celeusi* group. In the Miocene this North Atlantic route was interrupted by the moving of the North Pole and the considerable coolness of the climate. From the middle of the Tertiary the European climate became more and more cool until the critical times of the Pleistocene. The climatic changes caused an acceleration of evolutionary processes in the direction of greater specialization. A considerable number of species differentiated. During the Pliocene the configuration of continents and islands in the Mediterranean area became similar to the present. The bridges of land between Sardinia and the Iberian peninsula and between Sicily and Tunisia disappeared. The new islands were formed approximately where Sicily and Sardinia are now (Jeannel, 1942). At this time there probably appeared the Mediterranean insular species (*polonica*, *marginella*, *zelleri*). But insufficient data exist concerning the distribution of these very little known or recently distinguished species to be able to establish their origin exactly. Further investigations are needed. *Capperia polonica* is known from Sardinia and from Prinkipo Islands in the Marmora Sea. On the map of Pliocene Alpine foldings (Du Toit, 1937) both these localities, i.e. Sardinia and Marmora are to be seen on the same curve running from the Balearic Islands through Corsica to the sea of Marmora and Asia Minor. On the other hand, Sicily, which is inhabited by allied insular species, appears on another curve running through North Africa and the Apennines. A degree of coincidence between the distribution of species and the curves of Alpine foldings may be quite accidental, but it might be of some significance. However, further faunistic investigations in the Mediterranean area must establish whether a relation does exist here or not. Two other insular species, *Capperia marginella* and *C. zelleri*, are known from Sicily only. It is possible that they are exclusively Sicilian endemics, but this question needs further investigation. However, these two closely related species constitute a very well-differentiated group distinct from other related groups. Probably these two species were formed in the Pliocene on two islands occupying the present position of

Sicily. On the other hand, in the geocratic Post-pliocene period there existed a junction between Europe and Africa through Sicily and Sardinia. Jeannel (1942) even supposes the possibility of the existence of a Euro-African bridge down to interglacial periods. At such a period there would have existed probably an opportunity for the species mentioned to spread into the Apennine peninsula and northern Africa. Unfortunately no material belonging to the genus *Capperia* is known from those countries. The glacial catastrophe in the Pleistocene destroyed the existing species of *Capperia* in most parts of Europe, and probably in northern parts of west and central Asia too. The present northern limit of distribution of this genus provides evidence of this, in so far as it is shown by the remaining small areas of distribution of some Tertiary relict species near the northern limit of the distribution of the genus (*lorana*, *britanniodactyla*).

Capperia britanniodactyla is not, as was formerly thought, an endemic British form. It occurs also in the Rhineland. I could not find any morphological differences between British and continental specimens. Evidently the period of isolation of the British Isles from the Continent has been too short for the appearance of differences in British form. The junction of the British Isles with the Continent existed down to recent times, but *britanniodactyla* originates from the Tertiary. Zeuner (1946) puts the approximate date of separation of the British Isles from the Continent at 7,000–6,000 B.C., i.e. in post-glacial times. *Capperia britanniodactyla* is a very strongly specialized and separated species which appeared in the Tertiary when communication between Europe and North America had been already interrupted, i.e. about 30 million years ago. In comparison with that the 8,000 years during which the British specimens have been isolated is very short and evidently insufficient to permit the development of visible morphological differences in such a specialized species. In such a case it would be more probable to find, if they exist, ecological differences and maybe some changes in the life-history, but there is at present no information on these points. The northern limit of the distribution of *britanniodactyla* is very characteristic. It follows nearly exactly the southern limit of the Pleistocene glaciations which covered Scotland, northern, and partially central England. Southern England was never glaciated (Zeuner, 1945). Of twenty-two localities in Britain from which *britanniodactyla* is certainly recorded only six are situated outside the old limit of the glaciation, and even they are mostly near to this limit. These are indications of post-glacial migration. The remaining localities are within the never glaciated area. Owing to the maritime climate, the nearness of the glacier did not greatly decimate the flora and fauna of southern England (Jeannel, 1942), and the climate of the country during the glaciations was scarcely a few degrees cooler than at present (Beirne, 1943). It is thus very probable that *britanniodactyla* was able to endure the glacial period in England without the support of populations from the interior of the Continent. Besides, the very high specialization of the species is not propitious for easy migration. Very specialized forms, like *britanniodactyla*, are very conservative in changing locality. It is also possible that in such cases tropisms exist like those that play such a great part, for example, in the distribution of birds. When *britanniodactyla* appeared during the Tertiary it was faced very soon with a climate becoming more and more cool, and under these conditions a negative boreotropism could arise as a specific feature of *britanniodactyla*. This character, if it does exist, should be much more efficient against the northwards expansion of the species than any geographical barrier. However one tries to explain the distribution of *britanniodactyla*, it is a fact that it shows a northern limit closely following the southern limits of glaciation. It is very interesting that large organisms capable of long flights, like some birds or bats, to which geographical barriers like the English Channel present no difficulty, have the same northern limit of distribution as *britanniodactyla*. In Bartholomew's Atlas (1911), for example, there are mentioned the following families of birds as distributed in the southern part of the British Isles only: Timellidae, Plataleidae, Gruidae, Sittidae, Upupidae, Oedicnemidae, Picidae, Peristeridae. Other examples given there of animal groups having a similar distribution in Great Britain are: Rhinolophidae (Bats), Myoxidae (Rodents), *Dreissensia* (Molluscs), *Lucanus*, *Trox* (Beetles), Nemeobiidae, Papilionidae, *Limenitis*, *Gonepteryx* (Butterflies).

The eastern part of the Mediterranean area represents the richest asylum in which Tertiary forms of the group discussed survived during the Pleistocene. The eastern shores of the Black Sea, southwards of the Caucasus, are generally known for their many botanical Tertiary relics. The area would be especially interesting for species of this group. Unfortunately nothing is known from the region. Other interesting localities could be found where possible Tertiary relicts occur on the probable route of the genus *Capperia* along the southern frontier of Asiatic Russia, where some forms might have survived during the Pleistocene period. The glaciation of northern Asia reached 61–62° of N. latitude (Antevs, 1928), i.e. about ten geographical degrees less than in Europe and America. It is also very interesting to know how far eastwards the genus *Capperia* was distributed during the Tertiary. If, as is possible, it then reached Manchuria it has a good chance of surviving until the present. But these questions need further investigation on the spot.

On the continent of Angara, during its isolation from Europe in the first half of the Tertiary, two main lines derived from *Sphenarches* were separated. These lines initiated the recent genus *Geina* and, on the other hand, the genera *Oxyptilus* and *Crombrugghia*. During the Oligocene these lines passed by the arctic route in a moderate climate to North American territory. Intensive evolution of these lines happened later as the climate became more and more cool. The genus *Geina* developed more strongly in the American and *Oxyptilus* in the Eurasian continent. The more thermophilous line of *Oxyptilus* passed before the Pleistocene to the Mediterranean area and formed there the genus *Crombrugghia*. The genera *Geina* and *Oxyptilus* adapted themselves for a cooler climate. The appearance of these two genera in Europe must have been very late, probably after the glacial period, because *Geina* did not reach the British Isles at all and *Oxyptilus* only in two species.

Another group of evolutionary lines having a morphological structure similar to *Megalorrhipida*, and possibly derived from it, consists of the genera *Buckleria*, *Stangeia*, *Trichoptilus*, and probably some North American genera as yet undescribed. On this group of genera insufficient systematic work has been done to indicate more than an outline of their origin. The genera *Stangeia* and *Buckleria* have a type of distribution like that of the genus *Procapperia*, i.e. they form lines deriving from Egeida Meridionalis. *Stangeia* is distributed from the Mediterranean countries (*siceliota*) to the Indo-Australian area (*xerodes*). *Buckleria* is distributed from Ceylon and India (*paludicola*) to central Europe and Great Britain (*paludum*). These two genera, very similar externally to each other, belong to two very different evolutionary lines, which it is impossible to place in the same systematic unit. The genus *Trichoptilus* represents another line quite different morphologically (*pygmaeus*) and phylogenetically, which separated on the North American continent after the breaking of the communication with the Euro-Asiatic continent which existed in the Oligocene. Other North American species usually placed in *Trichoptilus*, like *parvulus*, *californicus*, *lobidactylus*, need further investigation and constitute probably other genera not yet described.

From the above considerations it appears that the genera which, on the basis of their morphology, ecology, and distribution, are to be considered as the less specialized (*Sphenarches*, *Megalorrhipida*) are really the most primitive and phylogenetically the least changed in the discussed group. The genera of this group put in order according to their phylogenetic age give a similar succession to that reached in the preceding sections, beginning with the most primitive *Megalorrhipida* and *Sphenarches*, passing to *Procapperia* and *Geina*, and gradually to *Capperia*, *Crombrugghia* and *Oxyptilus* as the most developed and specialized genera in the group.

8. SYSTEMATIC REVISION

I. Genus SPHENARCHES (Meyrick), 1886

Typus generis *Oxyptilus anisodactylus* Walker, 1864 (= *synophrys* Meyrick, nec *caffer* Zeller).

Sphenarches gen.n., 1886, Meyrick, *Trans. Ent. Soc. Lond.* **1886**: 8 ('type: *synophrys* Meyr.').

Sphenarches Meyr., 1910, Meyrick, *Wytsm. Gen. Ins.* **100**: 6 ('type: *caffer* Zeller = *synophrys* Meyr.').

Sphenarches Meyr., 1931, Fletcher, *Cat. Ind. Ins.* **20**: 10.

Sphenarches Meyr., 1931, Hori, *Bult. Sci. Fak. Terk. Kjušu Univ.* **4.**

Palpi without tuft of scales on second joint. Spot of scales very near top of third lobe of hind wing. This genus is distinguished by the very simple structure of the copulatory organs. Aedeagus straight or slightly curved, weakly sclerotized, not armed. Valva a weakly sclerotized lobe, simple, not armed. Ninth tergum weakly developed. Ninth sternum of the shape of triangular vesicular organ, sometimes modified as a more or less large plate covering the rest of the ventral side of the copulatory apparatus. Uncus well developed. Bursa copulatrix without signum. Ostium bursae slightly more sclerotized but without any marked characteristics.

The following species are included in the genus: *anisodactylus* Walker, *caffer* Zeller, *ontario* McDunnough, and *zanclistes* Meyrick.[1] It is possible that an examination of all the exotic species described by Meyrick as *Oxyptilus* may result in the transfer of further species to *Sphenarches*. The species named are probably all polyphagous.

Meyrick was apparently very vague about the genus. He described *zanclistes* (1905) as an *Oxyptilus*. This led later authors to make similar mistakes; McDunnough described his *ontario* (1927) as *Pterophorus*; Walsingham (1897) considered *Geina periscelidactyla* Fitch to be a *Sphenarches*.

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[1] *Sphenarches chroesus* Strand, 1913, from Spanish Guinea (Alen), most probably is only a synonym of *anisodactylus*.

The geographical distribution of *Sphenarches* is extremely wide. It appears in the tropics of both hemispheres and in the zone of moderate climate on either side of the equator.

1. **Sphenarches anisodactylus** (Walker), 1864

(Plate 18, figs. 47, 48, 50, 53)

Oxyptilus direptalis Walker, 1864, *Cat. Lep. B.M.* **30:** 934 (partim).
Oxyptilus anisodactylus Walker, 1864, *Cat. Lep. B.M.* **30:** 934–935.
Pterophorus diffusalis Walker, 1864, *Cat. Lep. B.M.* **30:** 945.
Sphenarches synophrys, Meyrick, 1886, *Trans. Ent. Soc. Lond.* **1886:** 17–18.
Sphenarches caffer Z., Meyrick, 1887, *Trans. Ent. Soc. Lond.* **1887:** 268 (partim).
Sphenarches caffer Z., Walsingham, 1891, *Ind. Mus. Notes,* **2:** 20–21 (partim).
Sphenarches caffer Z., Walsingham, 1897, *Proc. Zool. Soc. Lond.* **1897:** 56–57 (partim).
Sphenarches caffer Z., Hering, 1903, *Stettin. Ent. Ztg.* **64:** 96 (?).
Sphenarches caffer Z., Fletcher, 1909, *Spolia Zeylan.* **6:** 21–22 (partim).
Sphenarches caffer Z., Meyrick, 1910, *Wyts. Gen. Ins.* **100:** 6 (partim).
Sphenarches caffer Z., Meyrick, 1913, *Lep. Cat.* **17:** 5 (partim).
Sphenarches chroesus Strand, 1913, *Arch. Naturgesch.* **78:** A, **12:** 66 (?).
Sphenarches caffer Z., Fletcher, 1921, *Mem. Dep. Agric. India Ent.* **6:** 9–13 (partim).
Sphenarches caffer Z., Fletcher, 1931, *Cat. Ind. Ins.* **20:** 10–11 (partim).
Sphenarches caffer Z., Hori, 1931, *Bult. Sci. Fac. Terk. Kjušu Univ.* **4,** (3).
Pselnophorus dolichos Matsumura, 1931, *6000 Ill. Ins. Japan*: 1056, fig. 2071.
Sphenarches caffer Z., Hori, 1934, *Mushi,* **7:** 21 ('= *dolichos* Mats.').

Material examined. The following specimens in the British Museum were examined:

1. Male specimen, type of Walker's *anisodactylus*, labels as follows: 'Oxyptilus anisodactylus Wkr., type ♂', 'Type', 'Ceylon', '18. Oxyptilus anisodactylus' and '1947/50' (praep. genit.).
2. Male specimen, type of Walker's *diffusalis*: 'Pterophorus diffusalis Wkr. Type ♂', 'Type', 'Moreton Bay', '55. Pterophorus diffusalis' and '1947/51' (praep. genit.).
3. Male specimen, paratype of Meyrick's *synophrys*: 'New Hebrides, Mathew, 2274', 'Walsingham Collection 1910–427', 'Sphenarches synophrys Meyr. Paratype 2' and '1947/54' (praep. genit.).
4. Female specimen from W. Africa: 'Bathurst, Gambia, W. Africa, 1887, Carter 1070', 'Walsingham Collection, 1910–427', '*Sphenarches caffer* Z., named by Wlsm.' and '1947/53' (praep. genit.).
5. Male specimen from W. Africa, det. in the B.M. collection as *caffer* Z.: 'Bathurst, Gambia, W. Africa, 1887, Carter 1069', 'Walsingham Collection 1910–427' and '1947/5' (praep. genit.).
6. Male specimen from Peru: 'Callao Peru, 25.x.–31.xii.1883, Walker 3091', 'Walsingham Coll. 1910–427', '*Sphenarches caffer* Z. named by Wlsm.' and '1947/61' (praep. genit.).
7. Male specimen from West Indies: 'Balthasar (Windwardside) Grenada, W.I., H. H. Smith', 'Walsingham Collection 1910–427, 65010', '*Sphenarches caffer* Z. Named by Wlsm.' and '1947/62' (praep. genit.).
8. Male specimen from Madagascar, det. in the B.M. collection as *caffer* Z.: 'Madagascar, H. Perrot', 'Paravicini coll., B.M., 1937–383' and '1947/63' (praep. genit.).
9. Male specimen from India, det. in B.M. collection as *caffer* Z.: 'Nilgiris, Hampson Coll., 89–129' and '1947/64' (praep. genit.).

Nos. 1 and 2 are in the British Museum Type collection, the remainder in the general collection, labelled *Sphenarches caffer* Z. It was not possible to examine *Sphenarches chroesus* Strand, described from Alen, Spanish Guinea, but it is best to assume, from

Strand's description, that *chroesus* is a synonym of *anisodactylus* until such time as the type, or topotypes from Alen, can be examined.

Copulatory apparatus. Preparations of the types mentioned are preserved, whole, in alcohol. It was necessary, therefore, to examine them in this state, without sectioning or staining. No differences were observed in any of the male genitalia from the material examined. The structure is very simple. The valva is a spoon-like concave lobe, slightly sclerotized, without folds, processes, or spines. Aedeagus thin, tubular, nearly straight, curved ventrally towards the tip. The ninth sternum resembles a triangular vesiculum reaching to the centre of the valva only from its base. The ninth tergum takes the form of a small, triangular membranous flap. Beneath the tergum is the well-developed uncus curving ventrally. The female organs are also very simple. Bursa copulatrix without signum. The eighth sternum without any marked characteristics. The end of the ductus is more strongly sclerotized, terminating in a simple, unarmed ostium. Comparison of the preparations with the drawings of Hori (l.c., pl. x, figs. 6–8) revealed no differences.

General appearance of imago. The species varies considerably in size. Wing spread, 12–17 mm. The smallest specimens seen were from Grenada (12 mm.) and Ceylon (12·5 mm.), the largest were from Nilgiris (17 mm.) and from Gambia (13–16 mm.). It is unlikely that the variation in size has any connexion with geographical distribution as Fletcher (1921) records wing spreads between 13–15 mm. for Indian specimens, yet in the British Museum there are specimens up to 17 mm., as recorded above. The colour of fresh specimens is dusty dark yellow. Slightly worn specimens are whitish-yellow. These conditions may give rise to the opinion that the species is variable in colour, but this is not the case.

Early stages. Data on life-history are given by Walsingham (1891), Fletcher (1909, 1921), and Hori (1931). Fletcher's contribution (1921), based on Indian material, is very full, containing ecological details and descriptions of early stages. It is stated that the species is very polyphagous (see section 5) and has several generations a year. The development of a winter generation lasts about two months, spring and autumn generations about half this time.

Geographical distribution. The species is distributed throughout the tropics except in the Hawaiian islands (see section 6). It is present in some Pacific islands. Such widespread distribution has been attributed to the influence of cyclones and powerful air-streams (Fletcher, 1910). The extensive distribution of *anisodactylus* (under the name of '*caffer* Z.') was considered due to human agency (Fletcher, 1921). Meyrick (1927) suggests that it was introduced in the Samoan islands in imported plants of the families Cucurbitaceae and Leguminosae. This supposition is quite inadmissible when it is realized that these plants are not readily transplantable and are invariably transported to the islands in seed only. The seed will have been harvested and dried before shipment and the larvae of *anisodactylus* are unable to feed on seeds. The passage of living eggs and pupae is highly improbable in view of the brief life-cycle in these stages. The egg stage lasts two to six days (Fletcher, 1921). During this period it would be impossible for the food-plant to be harvested, the seed gathered and shipped to the islands, and for the newly emerged larvae to find fresh food-plants. Freshly emerged larvae, especially in the tropics, must have immediate access to suitable food or perish. On dried seeds they would die during transit. Another point is that *anisodactylus* lays its eggs on flowers and leaves only, never on seeds (Fletcher, 1921). In the previous section an attempt was made to attribute the wide distribution of *anisodactylus* to Continental Drift, surely a more probable theory in relation to this question.

2. **Sphenarches caffer** (Zeller), 1852

(Pl. 18, fig. 49)

Oxyptilus caffer sp.n., Zeller, 1852, *Linn. Ent.* **6:** 348–349.
Oxyptilus caffer Zell., Zeller, 1852, *Micr. Caffr.* 118.
Oxyptilus walkeri n.s., Walsingham, 1881, *Trans. Ent. Soc. Lond.* **1881:** 279–280.
Sphenarches caffer Z., Meyrick, 1887, Ibid. **1887:** 268 (partim).
Sphenarches caffer Z., Walsingham, 1891, *Ind. Mus. Notes,* **2:** 20–21 (partim).
Sphenarches caffer Z., Fletcher, 1909, *Spolia Zeylan.* **6:** 21–22 (partim).
Sphenarches caffer Z., Meyrick, 1910, *Wyts. Gen. Ins.* **100:** 6 (partim).
Sphenarches caffer Z., Meyrick, 1913, *Lep. Cat.* **17:** 5 (partim).
Sphenarches caffer Z., Fletcher, 1921, *Mem. Dept. Agric. India Ent.* **6:** 9–13 (partim).
Sphenarches caffer Z., Fletcher, 1931, *Cat. Ind. Ins.* **20:** 10–11 (partim).

Material examined:

1. Single male specimen from South Africa (British Museum collection), labelled as follows: 'Kimbolton, Eastcourt, Weenen, Natal, Htchsn. 1885, 325'; 'Walsingham collection, 1913–427'; 'Sphenarches caffer Z., named by Wlsm.' and '1947/52' (praep. genit.).

As Zeller's type specimen (a male) of *caffer* is in the Stockholm Museum (see Walsingham, 1891) there has been no opportunity of examining it. Zeller described this species from a single specimen from Caffraria giving only general information as to locality in the following words: 'Habitat in tractibus fluviorum Limpoponis et Gariepis'. As there were no fewer than three South African rivers named Gariep in the last century it is impossible to give any accurate definition of the original locality for *caffer*. The only possible definition is SE. Africa between 25° and 30° S. latitude. On old maps the name Caffraria was given to the SE. African territory in latitude about 30° S. and containing the greater part of Natal. The specimens described by Walsingham (1881) as *Oxyptilus walkeri* also originated from Natal. The types of this species are in the Capetown Museum, but unfortunately are without abdomens. Meyrick (1887) as well as Walsingham (1897) considered *walkeri* a synonym of *caffer*. Being at present unable to examine the Stockholm type specimen it is considered that the above-mentioned specimen from Natal (Kimbolton) is the topotype of *Sphenarches caffer* Zeller (= *walkeri* Walsingham).

The *copulatory apparatus* of the specimen from Kimbolton is of the same general appearance as *anisodactylus*, but with the valva and ninth sternum less primitive. Valva elongate, much narrower at the base than at the apex, which forms an enlarged flap. The ninth sternum is triangular, but much longer than in *anisodactylus*, reaching $\frac{2}{3}$ of the length of the valva. The ninth tergum triangular, membranous and weakly developed. Uncus and aedeagus similar to *anisodactylus*.

Early stages and food-plant unknown.

Geographical distribution: South Africa, Natal.

3. **Sphenarches ontario** (McDunnough), 1927

Pterophorus ontario McD., McDunnough, 1926, *Rep. Ent. Soc. Ontario*, **25:** 49 (*nomen nudum*).
Pterophorus ontario sp.n., McDunnough, 1927, *Trans. R.S. Can.* **1927:** 176, pl. 1, fig. 1.

It was not possible to examine this species. From the description and the figure of the male copulatory apparatus in McDunnough's publication (1927) there is no doubt that this form comes in *Sphenarches*.

The male *copulatory apparatus* most resembles *Sphenarches caffer*, but the valvae are more rounded at the ends.

Judging from McDunnough's description the imago also is similar to *caffer*. Wing spread is 14 mm.

Early stages and food-plant unknown.

Geographical distribution: Canada, Ontario.

4. **Sphenarches zanclistes** (Meyrick), 1905

(Pl. 18, figs. 51, 52)

Oxyptilus zanclistes sp.n., Meyrick, 1905, *J. Bombay Nat. Hist. Soc.* **16:** 581–582.
Oxyptilus zanclistes Meyr., Meyrick, 1913, *Lep. Cat.* **17:** 5 (partim ?).
Oxyptilus zanclistes Meyr., Corbett and Gates, 1926, *Bull. Dep. Agric. F.M.S.* **38:** 11 (?).
Oxyptilus zanclistes Meyr., Fletcher, 1931, *Cat. Ind. Ins.* **20** (partim ?).

Specimens examined from Meyrick's collection in the British Museum:

1. The male specimen (the first in the series of nine specimens named in Meyrick's collection as *zanclistes*) labelled as follows: 'Fort Stegman, Burma, N.M. . . ./88',[1] '*Oxyptilus zanclistes* Meyr., 9/1, E. Meyrick det. in Meyrick Coll.', 'Meyrick Coll., B.M., 1938–290' and '1947/72' (praep. genit.). This specimen is considered the lectotype.[2]
2. The specimen without abdomen: the same locality as above.
3. The remaining seven specimens are from India (Assam and Coorg, 3 specimens), Ceylon (2 specimens), and N. Australia (2 specimens). One specimen of them (Khasi Hills, Assam, iii. 1907) has copulatory apparatus identical with that of the lectotype (praep. genit. no. '1947/101'). It is not known whether the remaining specimens belong to the same species as the genitalia were not examined.

Male copulatory apparatus differs more from the generic type in this species than in any other. It approaches somewhat to the genus *Geina*. The most marked characteristic is the ninth sternum, consisting of a large rounded plate, cut out at its top centre. This plate covers the rest of the ventral side of the copulatory organs. Valva a spoon-like concave structure, as in other species, but much more narrow and only slightly enlarged at the end. Ninth tergum almost non-developed. Uncus thick, rounded at top, less curved than in other species. Aedeagus straight, pointed, thicker than in *Geina* species.

General appearance and size similar to *anisodactylus*. Wing spread of lectotype 15 mm. Ground colour yellow, but appearing rather darker than *anisodactylus* as there is a characteristic greyish tint not apparent in that species.

Early stages. Corbett and Gates (1926) record this species from Malaya. According to their data the larvae of *zanclistes* destroy the flowers of *Vigna catjang* Walp. (Leguminosae).

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[1] The capital letters after the locality on Meyrick's labels are the collector's initials and the figures following indicate the date (in this case 1888).

[2] Meyrick never indicated on his labels which specimens were types.

Geographical distribution. Lectotype was taken in the mountains of Burma. In Assam the species also appears in the mountains. The data concerning Ceylon, Malaya, and N. Australia should be verified.

II. Genus GEINA Tutt, 1907

Typus generis *Phalaena Alucita didactyla*, Linnaeus, 1758 (= *Petrophorus brunneodactyla* Millière).

Geina Tutt, 1907, *Brit. Lep.* **5:** 411 ('type *didactyla* Linn.') (non descr.).
Oxyptilus Z., Meyrick, 1910, *Wyts. Gen. Ins.* **100:** 6 ('= *Geina* Tutt') (partim).
Oxyptilus Z., Meyrick, 1913, *Cat. Lep.* **17:** 5 ('= *Geina* Tutt') (partim).
Pterophorus Geoffr., Barnes and Lindsey, 1921, *Contr. Nat. Hist. Lep. Amer.* **4:** 297–298 ('= *Geina* Tutt') (partim).
Oxyptilus Zeller, Fletcher, 1929, *Mem. Dep. Agric. India Ent.* **11:** 98 ('= *Geina* Tutt') (partim).
Oxyptilus Z., Fletcher, 1931, *Cat. Ind. Ins.* **20:** 12 ('= *Geina* Tutt') (partim).
Capperia Tutt, Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13:** 263 ('= *Geina* Tutt') (partim).

Palpi without tuft of scales. Third feather of hind wing with a spot of scales at extreme end. Lateral edge of second lobe of fore wing distinctly cut out in a deep semicircle. Hind angle of fore wing very distinct. Aedeagus straight, strongly sclerotized, without appendages, not armed. Valva strongly sclerotized, narrow, bent at middle, sometimes with process at free end. Ninth tergum (male) very weakly developed. Ninth sternum (male) strongly developed as a large, heavily sclerotized plate terminating in two rounded flaps. Uncus well developed. Bursa copulatrix without signum. Ostium bursae not armed, weakly sclerotized.

The following species are included: *didactyla* Linnaeus, *periscelidactyla* Fitch, *tenuidactyla* Fitch (= *cygnus* Barnes and Lindsey = *nigrociliatus* Zeller, nec Walsingham), *buscki* McDunnough, and probably *kuldschaensis* Rebel. They are probably all oligophagous species. The genus was separated as distinct by Tutt (1907) for the palearctic species *didactyla*, but unfortunately not described. Meyrick resynonymized (1913) *Geina* with *Oxyptilus* Zeller. Also in error it was allied to the genus *Capperia* Tutt, from which it is distinct, as shown by the structure of the aedeagus, the ninth male sternum, and the second lobe of the fore wing.

This is an exclusively Holarctic genus.

1. **Geina didactyla** (Linnaeus), 1758

(Pl. 10, fig. 6; Pl. 13, fig. 24; Pl. 15, fig. 32)

P. [*halaena*] *Alucita didactyla* Linnaeus, 1758, *Syst. Nat.* (ed. X), **1:** 542 (partim).
P. [*halaena*] *Alucita didactyla* Linnaeus, 1761, *Faun. Suec.* 370.
Pterophorus 'primus', Schaeffer, 1766, *Icones Insect. Ratisb.* pl. 93, fig. 7.
'Phalene tipule', De Geer, 1771, *Mem. Hist. Ins.* **2:** 260–261, pl. 4, figs. 1–11.
Alucita didactyla L., Denis and Schiffermüller, 1775, *Schmett. Wien*, 145.
Phalaena Alucita didactyla Villers, 1789, *Linn. Faun. Suec.* **2:** 531–532.[1]
Amplyptilia trichodactyla, didactyla, chrysodactyla Schiff., Hübner, 1826, *Verz. Bek. Schmett.* 430, no. 4184 (partim).[1]
Alucita didactyla Linn., Treitschke, 1833, *Ochsen. Schmett. Eur.* **9:** 237–238 (partim).[1]

[1] *Alucita trichodactyla* Hübner (*Samml. Eur. Schmett.* figs. 9, 18 (1800–1813)), cited by Wocke, Rebel, Hofmann, Meyrick, and others as a synonym of *didactyla* Linnaeus, has nothing to do with this species. Hübner's fig. 9 is *Oxyptilus chrysodactylus* Denis and Schiffermüller (= *hieracii* Zeller) and fig. 18 is *Capperia trichodactyla* Denis and Schiffermüller (= *leonuri* Stange).

Pterophorus didactylus Linn., Zeller, 1839, *Isis*, **32:** 275 (partim).
Oxyptilus trichodactylus Hbn., Zeller, 1852, *Linn. Ent.* **6:** 353.[1]
Pterophorus trichodactylus Herrich-Schäffer, 1854, *Schmett. Eur.* 5, Pter. tab. 3, fig. 13.
Pterophorus brunneodactyla Millière, 1854, *Ann. Soc. Ent. France*, (III), **2:** 65–68, pl. 3, figs. 6–6*a*.
Oxyptilus trichodactylus Hbn., Herrich-Schäffer, 1855, *Schmett. Eur.* **5:** 371.
Pterophorus brunneodactyla Millière, Bruand d'Uzelle, 1861, *Ann. Soc. Ent. France* (IV), **1:** 35–36, pl. 2, fig. 8.
Pterophorus didactylus Linn., Schleich, 1864, *Stettin. Ent. Ztg.* **25:** 96–98.
Oxyptilus didactylus L., Wocke, Heinem, 1876, *Schmett. Deutschl.* **2** (II): 791–792 (partim).[1]
Oxyptilus didactylus L., Hofmann, 1896, *Ber. Naturw. Ver. Regensburg.* **5:** 114 (partim).[2]
Oxyptilus didactylus L., Rebel, 1901, *Cat. Lep. Pal.* **2:** 71 (partim).
Geina didactyla Linn., Tutt, 1907, *Brit. Lep.* **5:** 411.[3]
Oxyptilus didactylus L., Spuler, *Schmett. Eur.* **2:** 324 (partim).
Oxyptilus didactylus L., Meyrick, 1910, *Gen. Ins.* **100:** 7.
Oxyptilus didactylus Linn., Meyrick, 1913, *Lep. Cat.* **17:** 8 (partim).
Oxyptilus didactylus L., Hering, 1932, *Tierw. Mitteleur.*, Ergänzbd. **1:** 164.
Oxyptilus didactylus Linné, Lhomme, 1939, *Cat. Lep. France*, **2:** 178.
Capperia didactyla (Linné), Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13:** 261.

In 1758 Linnaeus erroneously cited the food-plant of *didactyla* and also mixed the bibliographical references concerning two species, but in 1761 he corrected this mistake, writing that *didactyla* feeds '*Geo rivali*'. In the photograph of the Plumes in the Linnean collection (W. H. T. Tams phot.), one specimen of a *Geum*-feeder was recognized, quite well preserved. Also examined was the type of *brunneodactyla* Millière, borrowed from the Natural History Museum of Paris. This specimen was labelled: '*Brunneodactyla* Millière', 'Type', 'Coll. Mill.', '1901, coll. E. L. Ragonot, Muséum Paris'. It was a very well-preserved male of *Geina didactyla* Linnaeus. Millière described the form identical with *didactyla* as a new species because he doubtless used the work of Godart and Duponchel (1821–1842, *Hist. Nat. Lép. France*, **4:** 313), wherein *didactyla* was wrongly figured with brushes of hairs on the end of abdomen. Obviously it was a species belonging to *Oxyptilus* or maybe *Crombrugghia*. Another strange mistake concerning the name *brunneodactyla* is shown in two specimens from the collection of Constant (L. Lhomme collection). One of them was *distans* Zeller, another *pilosellae* Zeller, but both bearing the name *brunneodactyla* (T. B. Fletcher in litt., 1937). It is doubtful if these are the original determinations of Constant. The confusion over the name *brunneodactyla* was cleared up by Millière himself who synonymized his new species with *didactyla* (*Catalogue Lep. Alpes Mar.*: 380, 1875). Staudinger (1880) once more synonymized these two names (*Horae S.E.R.* **15:** 425).

Denis and Schiffermüller (1775) enumerated three species of this group, '*didactyla* L., *trichodactyla*, and *chrysodactyla*'. There is no doubt, however, that their '*didactyla* L.' was not the Linnean species. Laspeyre (1805) stated that *didactyla* L. and *didactyla* D. & S. were probably different species. Charpentier (1821) considered the specimens of *didactyla* and *chrysodactyla* in Schiffermüller's collection as identical. It is very probable that *didactyla* D. & S. was an *Oxyptilus* species not described at that time, probably *ericetorum* or *pilosellae* but not the Linnean *didactyla*. Unfortunately Hübner, who did not know the Linnean species, synonymized all three species in the Wiener collection as *trichodactyla* and his mistake was followed by other entomologists. Hübner's figures of *trichodactyla* really represent *chrysodactyla* D. & S. (*Sammlung*, fig. 9) and *trichodactyla* D. & S. (*Sammlung*, fig. 18; *Geschichte*, figs. 2 *a–b*) but not *didactyla* L. as is wrongly cited by many authors. Treitschke also used the name *didactyla* L. wrongly for some different species, mainly for *Capperia trichodactyla* D. & S., living on *Leonurus*, not on *Geum*. Zeller, who did not know the species living on *Leonurus*, determined his specimens of *didactyla* L. on Hübner's figure 18 of *trichodactyla*. However, Zeller's description and Herrich-Schäffer's figures of *trichodactyla* refer to the Linnean *didactyla*. Since Wocke's *Catalogue* (1876) the name *didactyla* L. has been correctly used for the Linnean *Geum*-feeder. The other so-called synonym of the Linnean species (see *Oxyptilus chrysodactylus* D. & S.) was, in spite of Zeller's remarks (*Isis*, 1841: 881–882), completely forgotten for one hundred years although it was the first name given for *Oxyptilus hieracii* Zeller.

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[1] This part though dated 1877 was published not later than Nov. 1876 (see Kirby, 1876, *Zool. Rec.* **13**, (Ins.) 187).

[2] The number of page taken from author's reprint having pagination pp. 1–195; original pagination is pp. 25–219; issued 1896, not 1895.

[3] Issued 1907, not 1906.

Copulatory apparatus. Valva rounded at the end, not pointed as in American *Geina* (Barnes & Lindsey, 1921, pl. 49). Aedeagus wider at the base, becoming much narrower at the end and more or less curved in the top part. Female copulatory apparatus of very simple structure. The plate of the ostium bursae symmetrical and more or less triangular, weakly sclerotized. Eighth sternum bluntly ended, not elongate. Bursa copulatrix without signum.

External appearance of the imago. Wing spread 18–23 mm. The spot of scales on the third feather of hind wings is large and rectangular. The other feature distinguishing this species amongst the palearctic Plume-moths is the deep, semicircular cut in the second lobe of fore wings. Generally the species is brightly brown-rusty coloured.

Life-history. In the neighbourhood of Warsaw the larvae of *didactyla* were found on three plants: *Geum rivale* L., *Geum urbanum* L., and *Potentilla rupestris* L. Both *Geum* species grow in humid and shady places, but *Potentilla rupestris* is found in dry, sandy, and sunny spots. Colour of larva varies according to the food-plant. On *Geum rivale* larvae are greyish-pink, on *Geum urbanum* greyish-green, and on *Potentilla rupestris* light green. The larvae feed on flowers and flower-buds, from which the contents are eaten out through a hole made in the side of the bud. In default of flowers they feed on leaves. Hofmann (1896) mentioned also *Veronica officinalis* as a food-plant of *didactyla*, but the larvae kept on this plant in my breeding experiments died, refusing this food. Treitschke's data on *Leonurus* as a food-plant of *didactyla* refer to *Capperia trichodactyla* D. & S. Experiments with *Leonurus* as a food-plant for *didactyla* larvae also resulted in failure. The larvae live during the month of May. The imago appears in June and July. There is one generation a year only.

Geographical distribution. *Geina didactyla* is recorded from nearly the whole of Europe except the British Isles, Iberian peninsula, and the Polar area. Outside Europe it is recorded only from Asia Minor. In several collections specimens from the central European countries and from France, Sarepta, and Asia Minor have been noted.

2. **Geina kuldschaensis** (Rebel), 1914

Oxyptilus kuldschaensis sp.n., Rebel, 1914, *Iris*, **28:** 272.
Oxyptilus kuldschaënsis Rbl., Caradja, 1920, Ibid. **34:** 79.

Rebel described this species from one specimen from southern Turkistan (western part of Thian-Shan Mountains), captured in June. Caradja (1920) recorded it from the Alai Mountains (Fergana). There has been no opportunity to examine this species. According to Rebel's description it is very similar to *didactyla* and of the same size (wing spread 21 mm.). Rebel cited the following differences between this species and *didactyla*: lighter, and without black basal line in cilia; the third feather of secondaries is yellow in the middle, not white. Provisionally it is thought that *kuldschaensis* should be considered a *Geina* until the type, which is in the Caradja collection, can be more accurately examined.

Early stages and food-plant unknown.

Geographical distribution: Turkistan.

3. **Geina periscelidactyla** (Fitch), 1854

Pterophorus periscelidactylus Fitch, 1854, *Trans. N.Y. Agr. Soc.* **14:** 843.
Oxyptilus periscelidactylus Fitch, Walsingham, 1880, *Pter. Calif. Oreg.* **25:** pl. 2, fig. 5.
Sphenarches periscelidactylus Fitch, Walsingham, 1897, *Proc. Zool. Soc. Lond.* **1897:** 57.
Oxyptilus periscelidactylus Fernald, 1898, *Pter. N. Amer.* **17–18:** pl. 2, figs. 3–4; pl. 5, figs. 1–2.
Sphenarches periscelidactylus Fitch, Walsingham, 1898, *Ent. Mon. Mag.* **1898:** 192.
Pterophorus periscelidactylus Fitch, Barnes and Lindsey, 1921, *Contr. Nat. Hist. Lep. Amer.* **4:** 299–301, pl. 41, fig. 4; pl. 49, fig. 5.
Pterophorus periscelidactylus Fitch, McDunnough, 1927, *Trans. Roy. Soc. Can.*, sect. V, **1927:** 176, pl. 1, fig. 2.

Walsingham placed this species in the genus *Sphenarches* (1897, 1898). As a matter of fact the genus *Geina* is nearer to *Sphenarches* than to *Oxyptilus*, but *Geina* constitutes a quite distinct taxonomic group which cannot be united with any other genus and which was correctly separated by Tutt (1907). This species was not closely examined, only the series of Walsingham specimens in the British Museum was seen. These specimens are similar to *didactyla* but much brighter, clear brown-coloured without rusty tint, and mostly smaller than the European species. They vary much in size. According to Barnes and Lindsey (1921) the wing spread is 16–20 mm. but Fernald (1898) gives a range of 14–29 mm.

The *geographical distribution* of *periscelidactyla* seems to be very wide because it is recorded both from Canada (McDunnough, 1926) and from the Southern States of U.S.A. (Fernald, 1898, and Walsingham, 1880).

The larvae are known as pests of grapes (*Vitis vinifera*). Whitcombe, Tomlinson, and Guba write that this species feeds on wild and cultivated forms of *Vitis labrusca* (*Bull. Mass. Agric. Exp. Sta.* **409:** 1943).

Fernald (1898), Barnes and Lindsey (1921), and McDunnough (1927) published the figures of male copulatory apparatus of this species, but the drawings of the above-mentioned authors differ from each other. Possibly there exists more than one species under the name *periscelidactyla*. This group should be more accurately revised and the copious data from the literature referred to by Barnes and Lindsey (1921) should be verified.

4. **Geina tenuidactyla** (Fitch), 1854

Pterophorus tenuidactylus Fitch, 1854, *Trans. N.Y. Agr. Soc.* **14:** 848.
Oxyptilus nigrociliatus sp.n., Zeller, 1873, *Verh. Zool. Bot. Ges. Wien,* **23:** 322–323.
Oxyptilus tenuidactylus Fernald, 1898, *Pter. N. Amer.* **20:** pl. 6, figs. 4–6 (partim).
Pterophorus cygnus sp.n., Barnes and Lindsey, 1921, *Contr. Nat. Hist. Lep. Amer.* **4:** 304, pl. 49, fig. 2.
Pterophorus tenuidactylus Fitch, Barnes and Lindsey, 1921, Ibid. **4:** 301–303 (partim).
Pterophorus cygnus B. & L., McDunnough, 1923, *Canad. Ent.* **55:** 85.
Pterophorus cygnus B. & L., McDunnough, 1933, Ibid. **65:** 205–206.

Owing to the great similarity of *tenuidactyla* Fitch and *buscki* McDunnough these two species are always mixed in the literature. On external appearance they differ from each other in colour; *buscki* is clearer reddish-brown and *tenuidactylus* is darker chocolate-brown. In the copulatory apparatus they are distinct but similar. These two species are distinguished by their ecology, living on different plants. The geographical distribution is similar—both species being recorded from Canada and U.S.A. Zeller (1873), describing his *nigrociliatus*, which is a synonym of *tenuidactyla*, added the following remarks: '*Lobidactylus* Fitch soll grösser sein als *tenuidactylus* (Flügelspannung 0,80 gegen 0,60; bei *periscelidactylus* 0,85), und kann also schon darum nicht einerlei mit *nigrociliatus* (vorderflügel 3‴ lang) sein. Ohne Zweifel giebt es in Nordamerika mehr *Oxyptilus*-Arten, als Fitch unterscheiden zu können glaubte.' Walsingham (1880) gives under the name *nigrociliatus* Z. a series of specimens from California (see *buscki* McD.). These specimens were examined in the British Museum and amongst them were observed three specimens a little darker than others from the same localities. This species was sent by Walsingham for determination to Zeller, who considered it as *nigrociliatus*. It is assumed that just one of these darker specimens was seen by Zeller and from his determination resulted the erroneous interpretation of the synonymy of this group by Walsingham and Fernald. Both Walsingham and Fernald distinguished the as yet undescribed *buscki* from *tenuidactyla*, but they wrongly named it *nigrociliatus*, which, of course, is a synonym of *tenuidactyla*. Fernald (1898) gives figures of male copulatory apparatus of the type of *tenuidactylus* Fitch. Thanks to these drawings it is possible to fix the proper synonymy. On the other hand, Fernald states that he did not find any difference in the structure of the copulatory apparatus between Fitch's type and paler Californian specimens, which Walsingham published as *nigrociliatus* Z. Fernald's opinion is not decisive in this case because his method of examining the genitalia was very primitive and, dealing with two very similar species, he could obtain no other result. As we see from his drawings, he used the same methods as Hofmann, who could not distinguish the genitalia of such distinct species as *Capperia trichodactyla* and *fusca* (1898) or *Capperia lorana* and *britanniodactyla* (1896). Thus it happened that Fernald established quite by chance the proper synonymy of *tenuidactyla* Fitch (= *nigrociliatus* Zeller). There is no doubt that Zeller's cotype in the U.S.A. National Museum and Fitch's authentic specimen both belong to the above-mentioned darker form and have identical genitalia (see Busck in McDunnough, 1933). The type specimen of *nigrociliatus* Zeller (from Delaware), which is present in the British Museum, belongs also to the darker form and is distinct from Walsingham's Californian specimens. Unfortunately Zeller's above-mentioned type had lost its abdomen and therefore it was impossible to see the pattern on the abdomen in which Barnes and Lindsey (1921) found some differences between *tenuidactyla* and *cygnus*. Described by Barnes and Lindsey (1921), the new species *cygnus* was based mostly on the differences in the genitalia of one worn specimen. This new species corresponded to the above-mentioned paler form not yet described. Unfortunately Barnes and Lindsey caused even greater confusion as they published by mistake the figure of the genitalia of the new species under the name of *tenuidactyla* and vice versa. In this way they added the new synonym *cygnus* for the darker form and the lighter one still was undescribed. This mistake was discovered by McDunnough (1923). In 1933 Busck gave (*in litteris*) the explanation of this confused synonymy (see McDunnough, 1933) and at the same time the paler coloured form was at last described as *buscki* McD.

The male *copulatory apparatus* of *Geina tenuidactyla* Fitch is represented by the figure of Barnes and Lindsey (1921) under the name of *Pterophorus cygnus* (l.c., pl. 49, fig. 2) and the figures of Fernald (1898) under the name of *Oxyptilus tenuidactylus* (l.c., pl. 6, figs. 4–6).

Geina tenuidactyla Fitch lives in the single generation on 'thimbleberry' (*Rubus parviflorus* Nutt. = *R. nuttkans*). McDunnough (1933) cited also 'strawberry' (*Fragaria* sp. ?) as a food-plant. The oligophagous character of the species belonging to the genus *Geina* makes possible the appearance of *tenuidactyla* also on 'blackberry' (*Rubus* sp.), which probably is a food-plant of the allied *Geina buscki*. It is better in this case not to base the determination of a species on its food-plant. Further ecological investigations are needed here.

Until the American data are greatly amplified we cannot obtain much information as to the geographical distribution of this species. The verified data record *Geina tenuidactyla* from Canada (McDunnough) and from north-eastern U.S.A. (Fitch, Zeller).

5. **Geina buscki** (McDunnough), 1933

Oxyptilus nigrociliatus Z., Walsingham, 1880, *Pter. Calif. Oreg.* **31:** pl. 2, fig. 8.
Oxyptilus tenuidactylus Fitch, Fernald, 1898, *Pter. N. Amer.* **20:** pl. 6, figs. 4–6 (partim).
Pterophorus tenuidactylus Fitch, Barnes and Lindsey, 1921, *Contr. Nat. Hist. Lep. Amer.* **4:** 301–303, pl. 49, fig. 1 (partim).
Pterophorus buscki sp.n., McDunnough, 1933, *Canad. Ent.* **65:** 206.

Very similar to the preceding species but clearer coloured. The data from literature under the name of *tenuidactyla* partially refer to *Geina buscki*, but all the material needs revision. It is possible that all data concerning the specimens of *nigrociliatus* or *tenuidactyla*, bred on blackberries (*Rubus* sp.) also refer to *Geina buscki*. The specimens of *nigrociliatus* recorded by Walsingham (1880) from California most probably belong to *buscki*.

The male *copulatory apparatus* was, according to Busck (see McDunnough, 1933), represented by Barnes and Lindsey (1921) under the name of *tenuidactyla* (l.c., pl. 49, fig. 1).

Probably widely distributed species in Canada and U.S.A., but at present the only verified records are from Canada (McDunnough, 1933).

III. Genus PROCAPPERIA gen.n.

Typus generis *Oxyptilus maculatus* Constant, 1865.

Palpi without tuft of scales. Spot of scales of the third feather of hind wings is remote from its end but nearer the end than in the genus *Crombrugghia*. The lateral edge of the second lobe of the fore wings very slightly curved, nearly straight. The hind angle of fore wings very weakly marked. Aedeagus strongly **S**-like curved, strongly sclerotized, bilaterally symmetrical but without any appendages such as processes or spines. Valva slightly arched, more strongly sclerotized in the basal half than in the distal half. The distal half of the valva enlarging in the form of a more or less oval flap having no folds or appendages. The ninth tergum pointed as in the genus *Capperia* but less developed. Uncus hidden under ninth tergum and very weakly developed. The ninth sternum in the form of a plate having its hind edge bifurcate and tucked up forwards. The ninth sternum short, reaching to one-third of the length of valva only. The ninth sternum (male) in its vesicular structure is similar to *Sphenarches*, but it is obviously developing to become a plate as in *Capperia*. Bursa copulatrix without signum. The ventral plate of eighth sternum at ostium bursae is formed like an irregular triangle a little more strongly sclerotized at its top, but otherwise having no characteristic features.

The genus is represented in the Mediterranean and Indo-Australian faunas. To it belong the following species: *maculata* Constant, *linariae* Chrétien, *croatica* sp.n., *anatolica* Caradja, and *pelecyntes* Meyrick. Probably all monophagous.

These species are distinguishable by their external appearance. According to the structure of copulatory apparatus they form two distinct groups, one Mediterranean, the other Indian. The species of the first group are all very similar in their copulatory apparatus. They cannot, however, be considered as forms of one species only, because of the considerable differences in the size and colour between *maculata*, *linariae*, and *anatolica*. The very distinct looking *croatica* could not be considered as a form of any previously described species and it has therefore been provisionally established as another species in this group, in order to complete the materials for further investigations. The collection of more ecological observations and also some data on the morphology of early stages are needed in order to show the most characteristic features of these forms. The group is an especially interesting subject for investigation because the differences that already exist are weak. It is a group of species *in statu nascendi*, providing for further investigators the chance of studying the causes of specific differentiation. It would be also very interesting to relate their taxonomic status with the evolutionary stage they have reached.

1. **Procapperia maculata** (Constant), 1865

(Pl. 10, fig. 12; Pl. 12, fig. 20; Pl. 14, fig. 28)

Oxyptilus maculatus Constant, 1865, *Ann. Soc. Ent. France*, **34:** 193–194, pl. 7, fig. 9.
Oxyptilus maculatus Const., Wocke, 1876, *Heinem. Schmett. Deutsch.* **2:** 792.
Oxyptilus maculatus Const., Staudinger, 1880, *Horae Soc. Ent. Ross.* **15:** 425–426.
Oxyptilus kollari Sta., Frey, 1880, *Lep. Schweiz*: 429.
Oxyptilus ? maculatus Const., Rebel, 1901, *Cat. Lep. Pal.* **2:** 71.
Oxyptilus maculatus Constant, Meyrick, 1913, *Lep. Cat.* **17:** 6.
Oxyptilus maculatus Const., Caradja, 1920, *Iris*, **34:** 5.

Oxyptilus maculatus Cst., Chrétien, 1922, *Étud. Lep. Comp.* **19:** 339.
Oxyptilus maculatus Constant, Lhomme, 1939, *Cat. Lep. France*, **2:** 178.
Capperia maculata Const., Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13:** 261.

Original description: 'Envergure, 20–23 mill. Ailes supérieures d'un brun jaunâtre, avec deux bandes transversales obliques et parallèles d'un blanc sale, sur chacun des deux lobes. Un trait transversal blanc, ombré de brun du côté interne, situé au point précis où l'aile se partage, et se prolongeant obliquement, par sa partie inférieure, jusqu'à la première bande blanche de la seconde division de l'aile. Frange entrecoupée de roux et de blanchâtre, avec çà et là quelques traits noirs le long du bord interne. Ailes inférieures d'un gris brun, avec la frange un peu plus foncée; troisième lobe à nervure blanche, avec une tache noirâtre, éclairée inférieurement de blanc, vers les deux tiers de sa longueur. Dessous des quatre ailes de la même couleur que le dessus, avec les mêmes dessins, sauf que le premier lobe des secondes ailes est ordinairement lavé de blanc. Tête et thorax jaunâtres; collier et ptérygodes blanchâtres. Antennes finement annelées de brun et de blanc. Abdomen roux; partie inférieure des anneaux ciliée de poils blancs dans toute sa circonférence, surtout chez la femelle; pointe anale de cette dernière marquée en dessus de deux traits blancs, rectilignes, longitudinaux et parallèles. Cuisses et tibias blancs en dedans, roux en dehors; articles des tarses roux, avec leur partie antérieure blanchâtre; éperons blancs, à pointe brune. Basses-Alpes, en juin et juillet.'

Examined material:

1. Two original specimens of Constant from Basses-Alpes, borrowed from L. Lhomme, bearing following labels: ♂—'Constant, maculatus' and a small triangular label, dark-lilac coloured; ♀—'Coll. Constant, Oxyptilus maculatus', '19' and a small, triangular, yellow-coloured label.
2. Male specimen from southern France (Hautes-Alpes), borrowed from T. B. Fletcher: 'La Grave 6.viii.1896, Tutt Coll.', '2367, Wlsm. 1896', 'Oxyptilus hieracii Z., named by Wlsm.'.
3. Female specimen from Italian Alps (British Museum (N.H.)): 'Frey Coll. Brit. Mus. 1890–62', 'P. Kollari? Z., Distans? Z., Aosta', and '1947/71' (genit. praep.).

Male copulatory apparatus. Valva slightly arched, flat, without folds and appendages. From the middle of its length the valva expands in the form of an ellipsoidal plate, rounded at the top. Aedeagus **S**-like curved, bilaterally symmetrical, without appendages. The ninth tergum pointed. The ninth sternum having two end flaps tucked up and turned forwards. It is a short, thick vesicular organ reaching only one-third of the length of the valva.

Female copulatory apparatus. The eighth sternum in the form of an irregular, triangular plate having its back top a little more sclerotized than other parts. Through this plate there is visible the end part of the ductus bursae in the form of a small elongated point, strongly sclerotized. There are no other characteristic features or appendages. Bursa copulatrix without signum.

External appearance. This is one of the largest species of the genus. Wing spread of examined specimens from 19–21 mm. (♀) to 20–22 mm. (♂). The spot of scales is not at the end of the third feather of the hind wing but very near to it and appears as a small weakly defined patch, existing chiefly on back edge of the feather. On its fore edge appear only a few single dark scales. Also a few single dark scales are present on the top of third feather. The middle and end parts of the third feather are white. The ground of fore wings dark brown with greyish tint. The lateral edge of the second lobe of fore wings very weakly curved, nearly straight. The hind angle of fore wing very weakly marked.

Constant described this species from Basses-Alpes. Caradja (1920) knew it in a series of specimens from La Grave (Hautes-Alpes). Caradja emphasized the similarity of *maculata* and *hoffmannseggi*. Really it is only a superficial similarity in colour to the dark coloured Asiatic specimens of *hoffmannseggi* and it is not, at present, certain that the latter are the same species as the lighter coloured specimens from Spain, whence *hoffmannseggi* was described. Further, *hoffmannseggi* belongs to the genus *Oxyptilus* and can easily be distinguished from *maculata* by the generic features. The best character for distinguishing *hoffmannseggi* from other species at first sight is its white cilia on the very top of the third feather of the hind wings, in both Spanish and Asiatic specimens. Caradja considered that Constant's original figure of *maculata* was nearly perfect. The figures in Constant's publication were painted by hand and therefore they probably differed in various copies of the same publication. The copy I used was probably not so carefully painted as Caradja's, because I could not identify with certainty the original specimens of Constant with his figure of *maculata*. Caradja considered too that *maculata* was closely allied to '*Oxyptilus hieracii*'. This is a very strange view: there is not one important character common to *Procapperia maculata* Const. and *Oxyptilus chrysodactylus* D. & S. (= *hieracii* Z.). It is possible that Caradja had wrongly named *hieracii*. Some earlier entomologists (Greening, Knaggs, Jordan, Stainton, Frey, and others) used to apply the name *hieracii* to *Capperia britanniodactyla* Gregson and in this case the similarity to *maculata* is understandable as the genera *Capperia* and *Procapperia* are nearly related but both very far from *Oxyptilus*.

Geographical distribution. Basses-Alpes (Constant), Hautes-Alpes (Caradja and Tutt's specimens from Fletcher's collection), Italian Alps (Zeller's specimen from Aosta, recorded by Frey (1880) as *kollari*, now in the British Museum), Pyrenees (*fide* Lhomme, 1939).

Time of appearance. June, July, and August. Obviously two generations, as may be seen from the male specimen of 6 August quite fresh and unworn.

Life-history. Chrétien (1922) gives some ecological data and describes the pupa. He writes that the larvae of *maculata* appear in the Hautes-Alpes in June feeding on *Scutellaria alpina*.

2. **Procapperia linariae** (Chrétien), 1922

(Pl. 20, fig. 61)

Oxyptilus linariae sp.n., Chrétien, 1922, *Étud. Lep. Comp.* **19** (I): 338–340, pl. DXLVI, fig. 4602.
Oxyptilus linariae Chrétien, Powell, 1922, Ibid. **19** (II): 87.

Chrétien's description of this species is based on the single male specimen bred on *Scutellaria* (see Powell's remarks) but bearing an erroneous name of the food-plant on its label. This specimen (not designated as type) is in the British Museum and bears the following labels: '*Oxyptilus linariae* sp.n.', 'Maroc, Timhadit, Harold Powell, Août 1920', 'Timhadit, éclosion du 23.8.1920, Chenille sur Linaire à feuilles crénelées. Août.' and '1947/12' (praep. genit.).

Below is quoted the original description of Chrétien and Powell's supplementary corrections published by Oberthür.

Original description: 'Un sujet ♂ obtenu de "chenille vivant sur une Linaria à feuilles crénelées" à Timhadit, en août 1920 (Powell). 17 mm. Ailes supérieures brun jaunâtre ou roux,

parsemées de fines écailles blanches dans la partie antérieure ou costale; la côte brun noir entre les taches et blanche à la partie apicale; une tache blanche dorsale au quart, précédée de brun roux foncé; une petite tache blanche antémédiane sur la disque, précédée d'un gros point brun noir; une strie blanche sur la bifurcation et deux stries transversales obliques blanches sur les lobes, se continuant dans les franges, mais en sens inverse, la première plus large; vers la côte, ces stries sont bordées de noir, la première extérieurement, la deuxième intérieurement. Franges brunes, entremêlées d'écailles noires et blanches; quatre petites mèches noires sur le bord postérieur du deuxième lobe.

'Ailes inférieures: les deux premières divisions brun roux, avec les franges brunes; la troisième division est légèrement marquée de blanc sur le bord antérieur, avant et après le petit groupe d'écailles noires qui sont presque d'égale longueur sur les deux bords et s'étendent assez près de l'apex. Franges brunes, portant quelques écailles noires réparties entre la base et le groupe d'écailles noires.

'Dessous brun roux, avec les taches blanches du dessus.

'Tête et thorax de la couleur des ailes supérieures; antennes annelées de brun roux foncé et de blanc, palpes brun roux ou noir, l'extrémité des articles marquée de blanc, le dernier à peine; abdomen brun jaunâtre roux, parsemé d'écailles brun roux foncé ou noir; l'extrémité des segments à écailles saillantes blanc crème; partie anale brun jaunâtre; pattes blanc crème, plus ou moins garnies d'écailles brunes ou noires, formant des lignes longitudinales sur les tibias, des taches sur les tarses; éperons blancs, à extrémité brune.

'Espèce voisine d'Ox. maculatus, Cst., plus que de toute autre. Je me suis peut-être étendu trop longuement dans la description qui précède: c'était cependant nécessaire, car, pour tâcher de séparer des espèces si voisines entre elles, où quelquefois il ne peut être question que du plus ou moins d'apparence dans les caractères, il importe de ne négliger aucun détail. Encore ne réussit-on que difficilement. Mais ce qui doit entraîner et assurer la conviction, c'est la nourriture de la chenille.

'La chenille d'Ox. maculatus, Cst. n'a pas été décrite; personne n'a dit l'avoir découverte et en avoir obtenu le papillon que le Catalog de 1901 considère comme espèce douteuse. Cependant, je la connais depuis de longues années; elle vit sur la Scutellaria alpina en juin, dans les Hautes-Alpes. Les papillons obtenus ont été soumis à Constant lui-même, qui a reconnu son maculatus. Leur détermination ne peut donc en être suspecte.

'La dépouille de la chrysalide d'Oxypt. linariae a la forme des chrysalides d'Oxyptilus: métathorax surélevé, avec dépression longitudinale des deux versants; extrémité des enveloppes libre; elle est grise, avec une bande dorsale plus foncée, des sous-dorsales bien moins distinctes; thorax finement chagriné garni de poils courts, au sommet, plus longs et à extrémité courbe en avant; segments de l'abdomen finement plissés transversalement sur les dos; les verruqueux de la chenille sont représentés par deux petits tubercules externes à poils étoilés, les plus longs inclinés horizontalement, l'un en avant, l'autre en arrière, et deux ou trois points internes portant un poil; ptérothèques gris brun, à nervures saillantes, brun foncé et garnies de cils en ligne et dirigés en arrière; cératothèques ciliés dans toute leur longueur; stigmates brun noir, peu distincts, dans une petite dépression concave; mucron prolongé en bec plat, dont l'extrémité est garnie de soies raides, à crochets.

'La chrysalide d'Ox. maculatus est gris clair; ptérothèques gris foncé, la dépression longitudinale plus creuse, les poils du mésothorax plus longs; les stigmates plus distincts, le mucron plus anguleux.

'Ox. hieracii, Z., a une teinte plus claire avec une large bande dorsale brun foncé.

'Ox. teucrii, Jordan, a des poils plus longs encore sur le mésothorax; les ptérothèques grises comme les nervures; le mucron plus anguleux.

'Inutile de parler des chrysalides d'Ox. tristis, distans, laetus, espèces vivant sur les Composées.

'La chenille d'Ox. didactylus a bien été trouvée aussi sur une Scrophulariée; mais il ne peut venir à l'esprit de comparer Ox. linariae à didactylus, à cause des trop grandes différences de la troisième division de leurs ailes inférieures.'

H. Powell's remarks on *linariae*:

'C'est par erreur que l'étiquette piquée à l'épingle de l'Oxyptilus obtenu d'éclosion à Timhadit,

en août 1920, indique, comme nourriture de la chenille, une Linaria. La plante n'est pas une Linaire, mais une Labiée, la Scutellaria Demnatensis. Si M. Chrétien n'avais pas été trompé par l'étiquette erronée, il aurait, peut-être, rattaché l'Oxyptilus linariae à O. maculatus Constant, dont la chenille vit également sur une Scutellaria ?'

Powell is wrong in his supposition. Chrétien described *linariae* as a new species not only because it was an ecologically distinct form but also because he knew how different it was in external appearance from *maculata* which he bred in the Alps. If Chrétien had known the proper food-plant of *linariae* he certainly would have described this species as distinct from *maculata.*

The *copulatory apparatus* of *linariae* is very similar to that of *maculata.* The valva a little wider and its end part more nearly triangular than elliptical as in *maculata.* The other parts very similar in both species.

In *external appearance* the specimen of Chrétien differs in colour and size from *maculata*; it is much smaller (wing spread 17 mm.) and much clearer coloured. The ground colour of fore wings is light brown with a yellowish tint, not dark brown as in *maculata.*

Life-history. Chrétien emphasized the ecological distinctness of *linariae* and *maculata,* but he did not know that *Linaria* was erroneously noted as food-plant of *linariae.* However, he was right because *linariae* and *maculata* breed on two distinct food-plants. *Procapperia linariae* Chrétien lives on *Scutellaria demnatensis.* Larvae appear in August, imagines at the end of this month. Doubtless there are at least two generations.

Geographical distribution. Morocco.

3. **Procapperia croatica** sp. n.

(Pl. 10, fig. 11; Pl. 12, fig. 18; Pl. 14, fig. 27)

Examined material:

1. Three specimens from Schawerda Collection (Deutsches Kolon. Museum, Bremen):
    a. ♂, 'Zengg, Kroatien, 22 Juni 1917' (Holotype).
    b. ♀, 'Zengg, Kroatien, 14 Jun. 1917' (Allotype).
    c. ♀, 'Zengg, Kroatien, 6.6.1917', 'Oxyptilus marginellus Z.' (det. Rebel) (paratype).
2. Five specimens from Dobiasch Collection (Magyar Nemzeti Museum, Budapest):
    a. Four specimens '22–23.vi.1918, Zengg, Kroatien, Dobiasch' (paratypes).
    b. Male specimen '24.vii.1918, Zengg, Kroatien, Dobiasch' (paratype).

Male *copulatory apparatus* (slide no. Ox. 83) very similar to *maculata.* Valva slightly arched, flat, from the middle to the end enlarged in the form of a flap, not rounded at the top as in *maculata,* but nearly pointed. No folds or appendages on the valva. Aedeagus **S**-like curved, similar to *maculata* but a little weaker, bilaterally symmetrical. The ninth sternum very similar to *maculata* but seems a little longer. The female copulatory apparatus (slide no. Ox. 100) very simply built, without any characteristic parts, even at ostium. Ostium bursae only a little more sclerotized than ductus bursae, scarcely visible under eighth sternum.

External appearance. The smallest species in the Mediterranean group of this genus. Wing spread 14–16 mm. Its small size distinguishes it from other species, as well as the colour, which is greyish-yellow. From *linariae* it is distinct, having no vivid light brown colour. Also it has no bright, vivid white pattern as in *anatolica*. The clear white pattern present in *croatica* appears only in cilia of fore wings except for some pattern on the wing surface which is whitish passing into light-yellowish. The black pattern is more apparent in *croatica* than in allied species. On the hind edge of the fore wings there are very distinct tufts of black scales. Palpi without tuft of scales. The spot of scales on the hind wings remote from the end of the third feather, not reaching the very top of it.

Early stages and food-plant unknown. There are two generations.

Geographical distribution. Southern Croatia.[1]

Holotype and one paratype—Colonial Museum, Bremen.

Allotype and five paratypes—Polish Museum of Zoology, Warsaw.

4. **Procapperia anatolica** (Caradja), 1920

Oxyptilus anatolicus sp.n., Car., 1920, *Iris*, **34:** 79.

Examined material:

1. One ♂ specimen (Magyar Nemzeti Museum, Budapest): 'Asia Min., Amasia 1888, Korb, marginellus, coll. Eppelsheim'.
2. One ♂ specimen (British Museum, London): 'Taurus Mts., Asia Minor, J., 06', 'Oxyptilus laetus Z., E. Meyrick det. in Meyrick coll.', '1947/2' (genit. praep.).
3. Three specimens (♂ and 2♀) from Georgia (British Museum, London): 'Kutais, Gagry, Paravicini', '7.8.12', 'Paravicini Coll. B.M., 1937–383' (placed in the B.M. Collection as *linariae*).

Original description. 'Zusammen mit voriger fing M. Korb bei Ak Chehir im Juli sechs Stücke ♂ ♀, die sich von distans-laetus durch folgende wichtige Merkmale leicht und sicher unterscheiden: Von kleinerem Ausmass und bräunlichgrauer Grundfarbe, sind die lichten Zeichnungen und Flecke auf dem Vorderzipfel der Vfl. rein weiss, breiter und schärfer abgegrenzt; die zwei äusseren weissen Querlinien sind näher am Apex und auch dichter aneinandergerückt. Die dritte Feder der Hfl. ist weiss mit grauen Fransen. Beine und Schienen weiss mit spärlicher brauner Ringelung. Auch Lord Walsingham hielt die Art für neu.'

Male copulatory apparatus (slide no. 1947/2) very similar to *maculata*. The only difference appears to be in the valva, which is more elongated and a little narrower.

External appearance. Wing spread: 16 mm. (Taurus), 17 mm. (Kutais), 18 mm. (Amasia). This species distinguished by very vivid white pattern on the fore wings. The specimens from Taurus and Amasia were dark yellow in the pure vivid colour without grey or brown tint. The specimens from Kutais are darker, with yellow colour passing into brown similar to *linariae*, from which it is distinct by its vivid white pattern. Probably the brownish specimens of Caradja correspond to the specimens from Kutais. The spot of scales remote from the end of the third feather. According to the description of Caradja the third feather seems to be white owing to the presence of numerous white scales along the surface of the feather and in its cilia.

Early stages and food-plant unknown. Imagines known in July and August. Doubtless two generations occur.

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[1] Rebel (*Rovartani Lapok*, **23**: 117) recorded a series of '*Oxyptilus teucrii* Jord. var. *loranus* Fuchs' from Zengg, 25.v–6.vi, Dobiasch coll. It is very probable that these specimens were also *croatica*.

Distribution. Asia Minor (Ak Chehir, Amasia, Taurus Mts.) and Georgia (Kutais).

5. **Procapperia pelecyntes** (Meyrick), 1908

(Pl. 20, fig. 60)

Oxyptilus pelecyntes sp.n., Meyrick, 1908, *Trans. Ent. Soc. Lond.* **1907:** 477.
Oxyptilus pelecyntes Meyr., Meyrick, 1913, *Lep. Cat.* **17:** 6.
Oxyptilus pelecyntes Meyr., Fletcher, 1921, *Mem. Dep. Agric. India Ent.* **6:** 14.
Oxyptilus pelecyntes Meyrick, 1935, Caradja's *Mat. Microlep. Faun. Chinas Prov.* 45.

Examined material:

1. A series of males and females from Ceylon (British Museum (N.H.), London). Genitalia were prepared from a male labelled as follows: '8426, Ceylon, Haldommulla, 8.7.1909, 2800 ft., W.O.'; 'Walsingham collection, B.M. 1910–427', '*Oxyptilus pelecyntes* Meyr.' and '1947/58' (genit. praep.).

Original description. '♂ ♀. 11–15 mm. Head dark fuscous. Palpi white banded with blackish. Antennae white lined with black. Thorax dark fuscous, with an ochreous-white posterior spot. Abdomen ochreous brown streaked with blackish, margins of segments mixed with white, with an ochreous-white basal patch. Legs white, anterior and middle pairs lined with black, posterior pair banded with black. Forewings cleft from middle, segments narrow, apex of second long-produced, slender, termen concave; dark reddish-fuscous, sprinkled with whitish-ochreous; first segment with a small white spot on base of lower margin, and two slender undefined somewhat inwardly oblique white bars at $\frac{1}{3}$ and $\frac{2}{3}$; second segment sometimes with a few scales at base and blackish patches before and between bars, in cleft grey with scattered black scales, on dorsum ochreous-white with a black scale-tooth before cleft, others at $\frac{1}{4}$ of second segment and apex, and a grey patch mixed with black midway between these. Hind-wings cleft firstly from about $\frac{1}{3}$, secondly from near base, segments linear; dark fuscous; cilia dark grey, on dorsum with two or three scattered black scales, and a moderate black scale-projection at $\frac{4}{5}$ of third segment, marked with some black scales on upper side also. Assam (Khasi Hills) in April and September; three specimens.'

External appearance. Wing spread 12–14 mm. The ground colour of wings dark rusty-brown. The cilia shorter than in Mediterranean species and because the feathers seem to be more separated from each other the specimens seem to be more delicate. The lateral margin of the second lobe of fore wings more strongly cut out than in Mediterranean species. Palpi without tuft of scales. The spot of scales removed inwards from the end of third feather to more or less $\frac{1}{4}$ of the length of this feather. On the top of third feather a few single dark scales.

The *male copulatory apparatus.* Aedeagus less strongly S-like curved than in Mediterranean species. Valva similar to *maculata* but straight, not arched, and very hairy on inner surface. The ninth sternum shorter than in *maculata* and very distinctly bifurcate at its end. The ninth tergum very elongate, triangular. Uncus very weakly developed.

Fletcher (1921) cited *Scutellaria discolor* as a food-plant of *pelecyntes.*

Early stages unknown. Imagines appear in April and September (Assam) and in July (Ceylon). Most probably more than two generations.

Geographical distribution. India (Assam) and Ceylon. Also recorded from Hunan Province in China (Meyrick, 1935).

IV. Genus CAPPERIA Tutt, 1907

Typus generis: *Oxyptilus britanniodactylus* Gregson, 1869 (= *heterodactyla* Tutt, *nec* Müller, *nec* Villers).

Capperia Tutt, 1905, *Ent. Rec.* **17**: 37 (non descr.).
Capperia Tutt, 1907, *Brit. Lep.* **5**: 470–471 (type: *heterodactyla*).
Oxyptilus Z., Meyrick, 1910, *Gen. Ins.* **100**: 6 (= *Capperia* Tutt) (partim).
Oxyptilus Z., Meyrick, 1913, *Cat. Lep.* **17**: 5 (= *Capperia* Tutt) (partim).
Pterophorus Geoffr., Barnes and Lindsey, 1921, *Contr. Nat. Hist. Lep. Amer.* **4**: 297–298 (= *Capperia* Tutt) (partim).
Oxyptilus Zeller, Fletcher, 1929, *Mem. Dept. Agric. India Ent.* **11**: 39 (= *Capperia* Tutt) (partim).
Oxyptilus Z., Fletcher, 1931, *Cat. Ind. Ins.* **20**: 12 (= *Capperia* Tutt) (partim).
Capperia Tutt, Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13**: 263 (partim).

Palpi without tuft of scales. Third feather of hind wing with a spot of scales at its end. Lateral margin of second lobe of fore wing slightly and indistinctly arched. No distinct tuft of scales on end of abdomen.

Aedeagus very strongly **S**-like curved[1] and strongly sclerotized, armed with appendages, often bilaterally asymmetrical. Valva elongated, very strongly sclerotized, provided with folds, flaps, or processi. The ninth tergum weakly sclerotized, forming a triangular flap covering the weakly formed uncus. The ninth sternum strongly sclerotized and in the form of a large plate reaching top of valvae and ending in a pointed bifurcation.[1] Bursa copulatrix without signum. Ostium bursae strongly sclerotized, armed with specific appendages. Sometimes the lamella antevaginalis appears as a strongly sclerotized plate covering ostium bursae from ventral side.

This is one of the most specialized genera both morphologically and ecologically. Here belong the following species: (1) *britanniodactyla* Gregson (= *teucrii* Jordan, = *heterodactyla* auct. nec Villers, nec Müller), (2) *celeusi* Frey (= *intercisus* Meyrick), (3) *washbourni* n.sp., (4) *ningoris* Walsingham, (5) *evansi* McDunnough, (6) *trichodactyla* Denis et Schiffermüller (= *leonuri* Stange = *affinis* Müller-Rutz), (7) *fusca* Hofmann, (8) *fusca* Hofmann n. forma *marrubii*, (9) *tamsi* n.sp., (10) *raptor* Meyrick, (11) *hellenica* n.sp., (12) *lorana* Fuchs, (13) *marginella* Zeller, (14) *zelleri* n.sp., (15) *polonica* n.sp., (16) *maratonica* n.sp., (17) *fletcheri* n.sp., (18) *geodactyla* Fuchs. This genus was created by Tutt for *heterodactyla* (= *britanniodactyla* Gregson) with its two 'variations': *lorana* and *celeusi*, and for *leonuri* (= *trichodactyla* D. & S.). It was wrongly synonymized by Meyrick with the genus *Oxyptilus* Z. from which it is very distinct morphologically and ecologically. All the species of the genus *Capperia* are monophagous, feeding exclusively on plants belonging to the family Labiatae. All have two generations a year wherever they occur, regardless of differences in climate.

Distributed in the Holarctic region only.

1. **Capperia britanniodactyla** (Gregson), 1869

(Pl. 10, fig. 10; Pl. 13, fig. 23; Pl. 14, fig. 29; Pl. 19, fig. 57)

Phalaena didactylus Donovan, 1800, *Brit. Ins.* **9**: 65–66, pl. 318.
Alucita heterodactyla Haworth, 1811, *Lep. Brit.* **3**: 479.

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[1] *C. raptor* and *C. tamsi* have less strongly curved aedeagus, also their male ninth sternum rounded at the end, not pointed.

Pterophorus heterodactylus Samouelle, 1819, *Ent. Useful Comp.*: 409.
Pterophorus didactylus Curtis, 1827, *Brit. Ent.* fol. 161.
Pterophorus heterodactylus Stephens, 1829, *Cat. Brit. Ins.* **2:** 231.
Pterophorus heterodactylus Rennie, 1832, *Consp. Butt. Moths*: 231.
Pterophorus heterodactylus Stephens, 1835, *Ill. Brit. Ent. Haust.* **4:** 377.
Pterophorus heterodactylus Wood, 1838, *Index Ent.*: 238, pl. 51, fig. 1651.
Pterophorus heterodactylus Westwood, 1845, *Brit. Moths*, **2:** 262, pl. 124, fig. 15.
Pterophorus hieracii Stainton, 1849, *Syst. Cat. Brit. Tin.*: 32 (partim).
Pterophorus hieracii Stainton, 1854, *List Brit. Anim.* **16:** 175 (partim).
Pterophorus heterodactylus Westwood, 1854, *Wood's Index Ent.*: 238, pl. 51, fig. 1651.
Pterophorus hieracii Stainton, 1859, *Manual*, **2:** 441 (partim).
Pterophorus hieracii Greening, 1867, *Ent. Mo. Mag.* **4:** 16–17.
Pterophorus hieracii Greening, 1867, Ibid. **4:** 39–40.
Pterophorus hieracii Knaggs (vii.1867) *Ent. Mon. Mag.* **4:** 40.
Oxyptilus britanniodactylus Gregson (v.1869) *Proc. Northern Ent. Soc.* (Manchester), meeting of 22.v.1869, 3–4.[1]
Pterophorus hieracii Jordan (vi.1869) *Ent. Mon. Mag.* **6:** 14–15.
Pterophorus teucrii (Greening), Jordan (vi.1869) Ibid. **6:** 14–15.
Oxyptilus britanniodactylus Gregson (viii.1869) *Entomologist*, **4:** 305–306.
Oxyptilus teucrii Jordan (xi.1869) *Ent. Mon. Mag.* **6:** 122.
Oxyptilus teucrii Jordan (xii.1869) Ibid. **6:** 151.
Oxyptilus teucrii (Greening) Jordan, Knaggs, 1870, *Ent. Ann.* **1870:** 143.
Pterophorus brittaniodactylus [sic!], Morris, 1870, *Brit. Moths*, **4:** 296, pl. 132, fig. 12.
Pterophorus (*Oxyptilus*) *teucrii* Barrett and Buckley, 1871, *Ent. Mon. Mag.* **8:** 155–156.
Oxyptilus parvidactylus Hw., Rössler, 1881, *Jahrb. Nassau Ver. Naturk.* **33–34:** 222 (partim).
Oxyptilus teucrii (Greening) Jordan, Frey, 1886, *Stettin. Ent. Ztg.* **47:** 18 (partim).
Oxyptilus teucrii Greening, Leech, 1886, *Brit. Pyral.*: 57–58.
Pterophorus heterodactylus Haworth, Mason, 1888, *Ent. Mon. Mag.* **25:** 162.
Oxyptilus heterodactylus Hw., Barrett, 1889, Ibid. **25:** 431 (partim).
Oxyptilus heterodactyla Müller, Tutt, 1890, *Ent. Rec.* **1:** 94.
Oxyptilus teucrii (Greening) Jordan, Hofmann, 1896, *Ber. Naturw. Ver. Regensburg*, **5:** 116–119, fig. 1 (partim).
Oxyptilus teucrii Fuchs, 1897, *Stettin. Ent. Ztg.* **1897:** 338.
Oxyptilus teucrii (Greening) Jordan, Reutti, Meess und Spuler, 1898, *Lep. Faun. Baden*, 152 (partim).
Oxyptilus heterodactyla Haworth, Crombrugghe, 1900, *Rev. Soc. Ent. Namur*, **4:** 47–48.
Oxyptilus heterodactyla Haworth, Crombrugghe, 1901, *Ann. Soc. Ent. Belg.* **45:** 103.
Oxyptilus teucrii Jordan, Rebel, 1901, *Cat. Lep. Pal.* **2:** 71 (partim).
Oxyptilus teucrii Jordan, Crombrugghe, 1906, *Mem. Soc. Ent. Belg.* **13:** 50.
Capperia heterodactyla Müller, Tutt, 1907, *Brit. Lep.* **5:** 471–490 (partim).
Oxyptilus teucrii Jordan, Spuler, 1910, *Schmett. Eur.* **2:** 324–325 (partim).
Oxyptilus heterodactylus Vill., Meyrick, 1913, *Lep. Cat.* **17:** 7 (partim).
Oxyptilus heterodactylus Vill., Meyrick, 1928, *Rev. Handb.*: 450.
Oxyptilus teucrii Jordan, Hering, 1932, *Tierwelt Mitteleur.*, Ergänzb. I: 165 (partim).
Capperia britanniodactylus Greg., Pierce and Metcalfe, 1938, *Genit. Brit. Pyral.*: 46, pl. 25.
Oxyptilus britanniodactylus Gregson, Fletcher, 1938, *Ent. Rec.* **1938:** 77–78.
Capperia britanniodactyla (Gregson), Adamczewski, 1938, *Fragm. Faun. Mus. Zool. Polon.* **3:** 235–236.
Oxyptilus heterodactylus Villers, Lhomme, 1939, *Cat. Lep. France*, **2:** 179 (partim).
Capperia britanniodactyla (Gregson), Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13:** 261–266.

The very complicated synonymy of this species was cleared up by Fletcher (1938) as follows: Our *Teucrium*-feeding *Oxyptilus* cannot be called *heterodactylus* Villers. De Villers, who described it as *P[halaena] A[lucita] heterodactyla*, (1789, *Linn. Ent.* **2**: 535, no. 1093) was not the original describer but merely copied the description from Müller, who described as *Phal[aena] Alucita heterodactyla* (1764, *Fauna Ins. Fridrichsdal*: 59) a Plume from Denmark. I do not think that it is safe to apply the name *heterodactyla* Müller 1764 to our *Teucrium*-feeder, as this *Oxyptilus* apparently does not occur in Denmark (it is not included in four Lists of Danish Species, the latest in 1930). Müller's description is very vague, merely 'black with white spots'—and of the known Danish Plumes it seems to apply best to *Pselnophorus brachydactylus* Kollar. The name *Alucita heterodactyla* Hw., 1811, taken from Villers, for the English *Teucrium*-feeder, is a primary homonym of *Alucita heterodactyla* Müller, 1764, and hence invalid, as are all subsequent citations of Haworth's name under *Pterophorus*, &c. Later on, this species was mixed up by Stainton under the name *hieracii* Zeller, which of course has nothing to do with it. Later still, it was known as '*teucrii* Greening' or '*teucrii* Jordan', but neither Greening nor Jordan ever described it as *teucrii*, which would have been an appropriate name. . . . I consider, therefore, that its proper name is *britanniodactylus* Gregson, 1869 (= *teucrii* Knaggs, 1870; see also Adamczewski, 1939). For my part I must add that in the main flora of Denmark (Lange, 1880) *Teucrium scorodonia* is not recorded, and *britanniodactyla* feeds exclusively on this plant. Even if this food-plant was overlooked in Denmark it certainly would be very rare there and, of course, not growing commonly in gardens. Müller, however, states that *heterodactyla* lives *in horto* just as *brachydactylus*, which feeds commonly on weeds (*Lactuca*, *Lapsana*) in gardens, as I have observed in England. Therefore, as Müller's description of the imago corresponds much better with the nearly black *brachydactylus* than the brown *britanniodactyla*, I think we can safely refer the name *heterodactyla* Müller to *Pselnophorus brachydactylus* Kollar as the proper name for this species.

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[1] *Fide* Fletcher's footnote (1946, *in litt.*) it was published at end of May 1869 before Jordan's note of vi.1869.

Examined material:

1. Six specimens labelled 'England' received from T. B. Fletcher's collection (genit. praep.: ♂—Ox. 73, ♀—Ox. 77).
2. Male specimen from Baden, named in Hofmann collection (British Museum (N.H.), London) as *Oxyptilus teucrii*, Green. and labelled: 'Hartwald, Herms. 22.6.91' (genit. praep.: 1947/107).
3. Female specimen from the same series, labelled 'Hartw., Reutti'.

External appearance. Capperia britanniodactyla is the largest palaearctic species in its genus. The wing spread of the specimens from Baden is 18–20 mm., from England 20–21 mm. Meyrick (1928) gives 20–23 mm. by mistake, having in his collection wrongly named specimens. The ground colour of the wings is dark chocolate-brown, the pattern pure white. It is one of the darkest coloured species of *Capperia*. The similarly dark *C. fusca* is much smaller (14–16 mm.). *C. britanniodactyla*, in form, pattern, and even colour, is very similar to some forms of *celeusi*, but it is larger and usually darker. The best features for distinguishing this species from *celeusi* and *lorana*, which are often confused with it, are those provided by the copulatory apparatus.

Male copulatory apparatus quite different from *lorana* but more similar to *celeusi*.

Valva slightly arched, more or less of the same width at both ends, bluntly ended. The flap on the valva projecting towards its base is large, elongate, and bluntly rounded at the end. Aedeagus quite different from that of *celeusi*; it also is **S**-like curved and bilaterally symmetrical, but shorter, thicker, and more strongly curved. Female copulatory apparatus similar to *celeusi*. The margin of the plate at ostium bursae formed like a '**U**' and turned with its rounded part to the front of the body. The outlet of the ostium bursae is into one of the arms of the '**U**' and in *celeusi* it is between these arms. My slides agree with the figures of the genitalia given by Pierce and Metcalfe (1938).

The habits and *early stages* of *britanniodactyla* were discussed by Tutt (1907: 476–490). I observed the species at Belmont Downs, Belmont, Surrey, in England. The habits of the larva agreed with the description of Gregson (viii.1869). After hibernation the larvae damaged the food-plant (*Teucrium scorodonia*) and caused its partial and gradual drooping. In the folds of the withered leaves the larvae were hidden during inclement weather or while moulting. The larvae always attacked the main stem of the plant, biting out a hole in one side of it, usually just below the uppermost circle of well-developed leaves. Consequently, all of the top part of the shoot, with the leaves and the terminal bud, withers and drops down. Sometimes the stem is completely cut and its top falls on the ground. A very good figure of a damaged plant was published by South (1881–1889).

The imago appears at the same time as the central European *trichodactyla*, i.e. from the end of May until August. Tutt collected all references in the literature concerning the time of appearance of the imagines and early stages of *britanniodactyla*, but he gave no opinion about the number of its generations. According to him the imagines appear at various times, depending on the weather, from the end of May and through June, and also in July and August. Gregson observes (*Ent.* **4:** 306) that the young larvae emerged from eggs laid in June, and very quickly grew during July of the same year. He also states that the young larvae leave the eggs in autumn. That gives evidence of two generations. I observed this species in 1947 when the spring was unusually late. On 3–7 June *Robinia pseudoacacia* was hardly flowering, i.e. 2–3 weeks later than usual. At this time I very carefully searched all plants of *Teucrium scorodonia* at Belmont Downs. In this locality *britanniodactyla* appears very locally, only in little shady places where *Teucrium* grows amongst bushes of *Rosa* and *Crataegus*. I did not find any traces of feeding in open sunny places or in completely shady spots. At this time all traces of feeding found there, i.e. bitten stems and perforated leaves, were already dried in spite of a delayed spring. I found no fresh traces indicating that larvae were still feeding, nor did I find any larvae. Only pupae were present, and they were attached to the main stem of plants near the places where the stems were damaged. All were orientated with the head downwards. The pupae on the green part of the stem below the damaged spot were green, while those above this spot, on the dried and darkened part of the plant, were dark, grey-brown in colour, and similar to their substratum. Imagines emerged from 10 to 20 June. Because *trichodactyla*, which is very similar in its habits and time of appearance, has two generations, I do not doubt that *britanniodactyla* behaves in the same manner. I am convinced of this from my own observations and from Gregson's data. Similarly, as was observed by Gregson in the case of *britanniodactyla*, the larvae of the second generation of some other species of *Capperia* grow very quickly and the imagines are already on the wing in July and August, even in cooler localities in mountains (see *C. fusca*).

Geographical distribution. Capperia britanniodactyla is recorded from several localities in England and once only from Ireland and Scotland (Tutt, 1907). This last locality is probably incorrect. The data concerning the appearance of this species on the Continent seemed doubtful because of confusion with similar species in the literature. Some of these statements I am able to correct because *britanniodactyla* doubtless is a monophagous species. As food-plants for the continental specimens of this group, *Teucrium scordonia, T. chamaedrys, T. scordium, T. botrys, Marrubium vulgare,* and *M. peregrinum* have been recorded. To *britanniodactyla* one can refer only the data concerning specimens bred or captured on *Teucrium scorodonia,* as follows:

1. Rössler (1881) mentioned dark coloured specimens larger than *parvidactylus* and similar to the figure of *marginella* given by Herrich-Schäffer, which were captured around *Teucrium scorodonia* in the neighbourhood of Dotzheim (Weisbaden).
2. Fuchs (1897) cited specimens of '*Oxyptilus teucrii*' captured at Lennig and Heimbachthale (Rhineland) on *Teucrium scorodonia.*
3. Reutti, Meess, and Spuler (1898) record '*Oxyptilus teucrii* (Greening) Jordan' from a few places in Schwarzwald (Baden) where it was collected on *Teucrium scorodonia*; they mentioned too 'var. *celeusi* Schmid (Frey)' living on *Teucrium chamaedrys.*
4. Crombrugghe de Picquendaele (1900, 1901) records '*Oxyptilus heterodactyla* Hw.' from Belgium (Forêt de Soigne) as the species common on *Teucrium scorodonia.* Also from Belgium (Forêt de Libin) it is cited by Tutt, 1907.

I examined the genitalia of the specimens captured by Reutti in Baden (Hartwald) which are present in the Hofmann collection in the British Museum. These specimens are identical with English *britanniodactyla.* It seems certain that the other above-mentioned continental specimens captured on *Teucrium scorodonia* also belong to *britanniodactyla.* The continental data concerning the specimens of *teucrii* or its so-called varieties *celeusi* and *lorana,* which were recorded from other plants like *Teucrium chamaedrys* and *Marrubium vulgare,* were, as I verified, not *britanniodactyla* but other species. Frey's data (1886) concerning the occurrence of *hieracii* in England on *Teucrium scordium* are, of course, erroneous because *scordium* was never recorded for English specimens of this group. Also Frey himself says that he did not know the relevant literature and cited only some information 'received from Regensburg'. Spuler's statement concerning *Marrubium peregrinum* as a food-plant in this group is also erroneous (see *Capperia fusca* forma *marrubii*). Hofmann's data (1896) on *Teucrium botrys* must be explained by further investigations; I could not find in the Hofmann collection the specimens bred on *Teucrium botrys.* Besides the data from Belgium and west Germany, the discussed species was recorded by Tutt (1907) from Spain (*heterodactyla*, Moncayo, July 1903, leg. Chapman). This record should also be verified.

As shown by the above survey, *britanniodactyla* is distributed in Europe along the middle and lower parts of the Rhine and its tributaries (Meuse) and this distribution extends northwards to the British Isles. In the Tertiary, when the British Isles were a part of the Continent, the river Thames was only a tributary of the Somme and Rhine (Le Danois, 1938). The presence of *britanniodactyla* in England is a relic of its ancient continuous distribution in the basin of the Rhine. This distribution gives evidence that this species appeared very long before our era (see Section 7). *Capperia britanniodactyla* (and probably *C. lorana* also) appeared during the first half of the Tertiary, on the west European island (Tyrrhenis) as one of many other forms which constitute the so-called Atlantic or Iberian element in the European fauna. These forms originated from the tropical Tyrrhenis partially preserved in western Europe. The increasingly cooler climate at the end of the Tertiary, and particularly the glacial periods of the Pleistocene, destroyed much of the Atlantic fauna in Europe. The classification of *britanniodactyla* amongst the Atlantic relics makes the records of this species from Spain (Tutt, 1907) and France (Lhomme, 1939) more probable.

2. **Capperia celeusi** (Frey), 1886

(Pl. 10, fig. 9; Pl. 12, fig. 22; Pl. 15, fig. 30)

Oxyptilus marginellus Z., Hofmann & Herrich-Schäffer, 1855, *Lep. Faun. Regensburg*, Fortsetz. 148.

Oxyptilus marginellus Zell., Herrich-Schäffer, 1856, *Syst. Schm. Eur.* **5:** 372–373 (partim).

Oxyptilus parvidactylus Hw., Rössler, 1881, *Jb. Nassau Ver. Naturk.* **33–34:** 222 (partim).

Oxyptilus celeusi Schmid in Frey, 1886, *Stettin. Ent. Ztg.* **47:** 18.

Oxyptilus celeusi (Schmid) Frey, A. Schmid, 1887, *Korresp. Bl. Naturw. Ver. Regensburg.* **40:** 200–202.

Oxyptilus teucrii (Greening) Jordan, var. *celeusi* (Schmid) Frey, Hofmann, 1896, *Ber. Naturw. Ver. Regensburg.* **5:** 116–119, figs. 2, 9*ab* (partim).

Oxyptilus teucrii var. *celeusi* (Schmid) Frey, Reutti, 1898, *Lep. Baden*: Zweite Ausgabe, 152.

Oxyptilus teucrii (Greening) Jordan, Klemensiewicz, 1899, *Spraw. Kom. Fizyogr.* **34:** 201.

Oxyptilus teucrii Jordan var. *celeusi* Frey, Rebel, 1901, *Cat. Lep. Pal.* **2:** 71.

Capperia heterodactyla Müller var. *celeusi* Frey, Tutt, 1907, *Brit. Lep.* **5:** 474–475.

Oxyptilus teucrii Jordan var. *celeusi* Frey, Spuler, 1910, *Schmett. Eur.* **2:** 325 (partim).

Oxyptilus teucrii Stange [sic!], Stöckl, 1911, *Kosmos, Lwów,* **35:** 220.

Oxyptilus heterodactylus Vill., Meyrick, 1913, *Lep. Cat.* **17:** 7 (partim).

Oxyptilus teucrii Jordan, Schille, 1914, *Kosmos, Lwów,* **39:** 181–182.

Oxyptilus teucrii (Jord.) *celeusi* Frey, Rebel, 1917, *S.B. Akad. Wiss. Wien.* **126:** 800 (?).

Oxyptilus teucrii Jordan, var. *celeusi* Frey, Bauer, 1917, *Mitt. Ent. Ges. Halle*: 11.

Oxyptilus teucrii Jordan, Müller-Rutz, 1927, *Mitt. Schweiz. Ent. Ges.* **13:** 514.

Oxyptilus teucrii Jord., Skala, 1929, *Ent. Z.* **43:** 197.

Oxyptilus intercisus sp.n., Meyrick, 1930, *Exot. Microlep.* **3:** 565.

Oxyptilus teucrii Jord. var. *celeusi* Frey, Rebel & Zerny, 1934, *Denkschr. Akad. Wiss. Wien,* **103:** 134 (?).

Oxyptilus teucrii J., *celeusi* Frey, Müller-Rutz, 1932, *Mitt. Schweiz. Ent. Ges.* **15:** 240.

Oxyptilus celeusi Frey, Hering, 1932, *Tierwelt Mitteleur.*, Ergänzbd. I: 165.

Oxyptilus heterodactylus Villiers, var. *celeusi* Frey, Lhomme, 1939, *Cat. Lep. France,* **2:** 179 (partim).

Capperia celeusi (Frey), Adamczewski, 1938, *Fragm. Faun. Mus. Zool. Polon.* **3:** 237.

Capperia celeusi (Frey), Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13:** 261–266.

Examined material of *Capperia celeusi* (Frey):

1. Type specimen of '*Oxyptilus intercisus*, Meyrick' (Deutsches Entom. Institut, Berlin): 'Oesterr. Küstenland, Fužine 7.6.1906, legit M. Hilf.', 'Coll. O. Leonhard', 'Typus', 'Meyrick det. *Oxyptilus intercisus* Meyr.' (female).
2. Male specimen of '*Oxyptilus intercisus*, Meyrick' from Meyrick Coll. (B.M., London): 'Fuzhine, Croatia, M.H., 5.06.', 'Meyrick Coll. B.M. 1938–290', '*Oxyptilus intercisus*, Meyr. 3/1, E. Meyrick det. in Meyrick Collection', '1947/65' (genit. prep.).
3. Male specimen of '*Oxyptilus britanniodactylus* f. *celeusi*' (T. B. Fletcher Coll.): 'Regensburg'.
4. Male specimen of '*Oxyptilus teucrii*, Jordan' (J. Müller-Rutz Coll.): 'Engadin, Switzerland'.
5. Male specimen of '*Oxyptilus teucrii*' (Państwowe Muzeum Zoologiczne, Warsaw): 'Austria'.
6. Male specimen of '*Oxyptilus kollari*' from Italian Alps (Magyar Nemzeti Muzeum, Budapest): 'Gomagoi'.
7. Male and female specimens of '*Oxyptilus teucrii* var. *celeusi*' (Coll. Jäckh): 'Kaltenberg, Thüringen'.
8. Male specimen of '*Oxyptilus*' (Magyar Nemzeti Muzeum, Budapest): 'Budafok, Hungaria'.
9. Male specimen of '*Oxyptilus kollari*' (Magyar Nemzeti Muzeum, Budapest): 'Hautes Pyrénées, Cauterets, Juillet 1890, T. Seebold, coll. Eppelsheim'.
10. Male specimen of '*Oxyptilus parvidactylus*' (Magyar Nemzeti Muzeum, Budapest): 'Deliblat, Uhryk G., Flammunda 26.6.1909', '*O. parvidactylus*, det. Rebel'.
11. Male specimen of '*Oxyptilus teucrii*' from South Poland (Coll. Klemensiewicz, Cracow): 'nr. 4594, dr. O. Hofmann det. *teucrii*, dr. H. Rebel det. *leonuri*'.
12. Male specimen of '*Oxyptilus hoffmannseggi*' from France? (Coll. Constant): without further data, name only.
13. Male and female specimens of '*Oxyptilus teucrii* Jordan' from South Poland (Coll. Stöckl, Lwów): 'Janów ad Lwów'.
14. Series of males and females of *Capperia celeusi* (Frey) taken in several localities in Dniestr valley in Podolia (south Poland, districts Zaleszczyki and Borszczów) on *Teucrium chamaedrys*, leg. S. Adamczewski, 1934-1938 (Państwowe Muzeum Zoologiczne, Warsaw).

Besides the specimens enumerated above there were examined two specimens wrongly named and recorded as *Oxyptilus teucrii* Jordan. They are a male specimen from France (Alpes-Maritimes) recorded by A. Schmidt (*Enc. End.* B. *Lepidoptera*, **3:** 131, Paris, 1928) and a male from Poland (Lwów) recorded by Romaniszyn (*Pol. Pismo Ent.* **8:** 222, 1929). The specimen from Poland was *Oxyptilus parvidactylus* Hw. (genitalia examined) and the specimen from France was an *Oxyptilus* very similar to *parvidactylus* Hw. and probably belonging to that species. However, it is not yet clear which species of this group appear in the Mediterranean area.

The first indication of the distinctness of the species living on *Teucrium chamaedrys* is in Rössler's work (1881).[1] Rössler, discussing specimens living on *Teucrium scorodonia* in the Rhineland, suggested that it was distinct from *parvidactylus* and that it might be the same species as the English *teucrii* or the species distinguished by Schmid from Regensburg as feeding on *Teucrium chamaedrys*. As seen from Rössler's remarks, *Capperia celeusi* was already known in 1881 or before, having been recognized as a distinct species by Schmid. But in the literature this name does not appear until 1886 when Frey refused to recognize it as a species, saying that *celeusi* and *teucrii* are only variations of *hieracii*. (Similarly, in 1856, Frey united with *parvidactylus* the Swiss specimens of *Capperia fusca*, in spite of the fact that he well knew the differences in the life-histories of the two forms. This error of Frey resulted in many difficulties in the systematics of this group and the Swiss entomologists still are not able to give the correct names for these forms.) Frey (1886) gives a few particulars concerning *celeusi*, and according to the rules of nomenclature we must consider Frey's criticism of the distinctness of *celeusi* as a valid description; therefore the name *celeusi* bears Frey's name as describer, because it is really a distinct species. Unfortunately, Schmid's description of *celeusi* was published later (1887), after Frey's remarks. Frey did not know this group well, but it is so difficult that even Zeller, the best microlepidopterologist of the period, made some mistakes in it. Zeller named the specimens from Regensburg, doubtless belonging to *celeusi* (which was not known then), as *marginella* Herrich-Schäffer (1856). Schmid published his description of *celeusi* while he was discussing the problem with Frey (1887). He gave some morphological and ecological features distinguishing this species. Unfortunately the authority of Frey prevailed in the opinion of entomologists and even in the last catalogue of Rebel (1901) *celeusi* still appears as a variety only. This was mainly due to Hofmann, who published (1896) his erroneous observations about the identity of the genitalia of *celeusi*, *teucrii*, and *lorana*. (Similarly, in 1898, Hofmann considered identical the genitalia of *trichodactyla* ('*leonuri*') and *fusca*, thus increasing the chaos introduced by Frey into the systematics of Plume-moths.) *Oxyptilus intercisus* Meyrick, as has been proved by examination of the genitalia of Meyrick's types, was simply *Capperia celeusi*. Meyrick created *intercisus* (published in *Exotic Microlepidoptera* as from Croatia!) as a new species because he did not know the European Microlepidoptera well. In his collection there were no specimens of *celeusi* and the nearest species *heterodactyla* (= *britanniodactyla* D. & S.) was quite wrongly determined. Under the name *heterodactyla* there was in the Meyrick collection a series of Swiss specimens near to *distans* Zeller which at present I am not able to name (see genus *Crombrugghia* Tutt). Other species of this group were also wrongly named in Meyrick's collection; for example, under the name *pilosellae* there is only one specimen of that species, labelled 'Germany', but there is, also under *pilosellae*, a series of *chrysodactyla* D. & S. (= *hieracii* Z.). Excepting the specimens of *intercisus*, there are no specimens of *celeusi*, and similarly many other European species are lacking in Meyrick's collection. Looking through the Meyrick collection, it is difficult to understand how it was possible to describe new palearctic species without comparative material of so many species and with so many specimens of other species wrongly named.

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[1] Much earlier, in 1864–1866, Rössler distinguished amongst *Oxyptilus obscurus* Z. the specimens from Lorch as different. Judging from Rössler's description, they probably were specimens of *Capperia lorana* (see Rössler, *Jahrb. Nassau Ver. Naturk.* **19–20:** 263).

Capperia celeusi Frey is a medium-sized species in its genus. The wing spread is 16–20 mm. It varies in size even in the same generation. Specimens captured in the same locality and at the same time and perhaps belonging to the same population vary much in size, as I observed in the valley of Dniestr in June. But on the south slopes of the Dniestr valley they occur in very dry and burnt places near other areas that are covered with fresh vegetation, and this fact may be connected with the differences in the size of imagines and may be due to the different quality of food. In the colour of *celeusi* there is also some variability. Using the terminology of Tutt

(1907) one can distinguish amongst *celeusi* three types of colour: coffee-brown, yellow-brown, and greyish-brown. The darkest coloured (coffee-brown) specimens are those from Croatia (*intercisus*). The specimens from Regensburg (Bavaria) and from Lwów (coll. Stöckl.) are brighter (yellow-brown). (The brown-coloured specimens of Hofmann from Urach belong to another species—see *Capperia fusca* forma *marrubii*.) From other localities the specimens are more or less brown with a grey tint. Similar variation in colour occurs in *Oxyptilus parvidactylus* Hw., and consequently the external appearance of greyish-brown specimens of the two species is sometimes extremely similar. (In the Mediterranean area there exist also some species of *Capperia* very similar to *celeusi*.) Amongst the greyish-brown specimens of *celeusi* there are also some differences. The greyish specimens from the Dniestr valley (Podolia) have their white pattern weakly developed, but the greyish specimens from Thuringia are vividly marked with white and all the white bands on the wings and white spots in the cilia are larger than in specimens from Podolia. Some specimens from Thuringia have, moreover, a white spot in the cilia of the hind margin of the second feather of secondaries (which is present also in *C. washbourni*). The tuft of scales on the hind wing varies also with the degree of darkness of the specimen and the quantity of white scales in it, but these are very small differences. It is necessary to collect much material of bred series from several localities in order to study the variability of *C. celeusi*.

The *copulatory apparatus*. Valva slightly arched, strongly sclerotized, and of nearly the same width throughout its length. The flap on the valva projecting towards its base is not very long and is bluntly rounded at the end. The top of the valva more or less obliquely cut off and in the specimens from Podolia, Bavaria, and Switzerland more pointed, but in those from Thuringia and Hungary it is more bluntly ended (may be the results of mounting in Canada balsam and not real differences). The ninth tergum is pointed in specimens from Podolia and Hungary and has a small incision on the top in the specimens from Germany. The specimen from Lwów is intermediate, having scarcely any incision on the top of the ninth tergum, but in its colour this specimen is most similar to the specimen from Bavaria. Aedeagus strongly curved like an 'S', without asymmetric appendages and very constant in form. The ninth sternum bifurcate at the end in the form of two pointed flaps reaching the top of the valvae. The female copulatory apparatus with a very characteristic plate at the ostium bursae. The form of this plate is like a 'U' or an irregular triangle, of which the base is situated at the ostium and the elongated top is asymmetrically curved on the side. The ostium bursae lies between the arms of the 'U'.

The distinctness of *celeusi* from *britanniodactyla* is confirmed by the difference in appearance of their larvae. Hofmann gives a description of the larva of *celeusi* (1896) and cites also a different description of the larva of *britanniodactyla* by Leech (1886).

The *life-history* of *celeusi* needs careful study because in the published literature there are several errors. Certain allied species have been confused and for this group the following food-plants are recorded from England, France, Belgium, Poland, and Germany: *Teucrium chamaedrys* (Rössler, 1881; Frey, 1886; Schmid, 1887;

Hofmann, 1896; Adamczewski, 1938; Lhomme, 1939), *Teucrium scordium*[1] (Frey, 1886), *Teucrium scorodonia*[1] (Rössler, 1881; Fuchs, 1897; Reutti, Meess, and Spuler, 1898; Crombrugghe, 1900, 1901), *Teucrium botrys* (Hofmann, 1896; Lhomme, 1939), *Marrubium vulgare*[2] (Rössler, 1881; Steudel and Hofmann, 1882; Hofmann, 1896; Lhomme, 1939), *Marrubium peregrinum*[2] (Spuler, 1910; Lhomme, 1939). Further, Tutt (1907) recorded *Thymus serpyllus* amongst the food-plants of *parvidactylus*. With *parvidactylus*, which feeds on Compositae, species of the genus *Capperia*, which feed monophagously on various Labiatae, have very often been mixed. *Thymus* belongs also to Labiatae and it would be very interesting to know to what genus the specimens from *Thymus* mentioned by Tutt belong. Could they be a new *Capperia*? Because of the strict monophagy of the species of *Capperia* it is quite certain that the insects breeding on the above-mentioned plants belong to several different species, some of which may not yet be described. Examination of Reutti's specimens showed that the continental insects feeding on *Teucrium scorodonia* are *C. britanniodactyla*. Hofmann's specimens from *Marrubium vulgare*, also examined, belong to *C. fusca* forma *marrubii* and are quite different from *celeusi* and close to *fusca*. The specimens recorded from *Teucrium scordium* and *Marrubium peregrinum* never existed on these plants, the names of which were evidently changed by Frey and Spuler. The specimens bred from *Teucrium chamaedrys*, which I examined, were all *C. celeusi*. The only specimens I could not find were those from *Teucrium botrys* recorded by Hofmann, but it will be better to postpone further discussion of them until they can be examined; they might be *C. lorana*.

So far as is known *Capperia celeusi* is a monophagous insect breeding on *Teucrium chamaedrys*. It appears in two generations. The imagines of the first generation fly from the end of May till the middle of June (Adamczewski, 1938). The summer generation is on the wing through the second half of July. Late specimens appear in the beginning of August (Hofmann, 1896).

Geographical distribution. *Capperia celeusi* has been recorded under various names from Spain, France, Belgium, Switzerland, Saxony, Thuringia, Bavaria, Baden, Württemberg, Rhineland, Croatia, Slovenia, Montenegro, Albania, Macedonia, Hungary, Romania, and Poland. Most of these are physiographic data without any supplementary particulars, and without the examination of specimens they cannot be verified. These records are useless, especially Rebel's from the Balkan States. Müller-Rutz (1938, *in litteris*) gives the following localities for *celeusi* in Switzerland (under the name '*Oxyptilus teucrii* Jordan'): Brig, Kalpetran, Mendrizio, Ardez, Engadin. I verified only his record from Engadin, which was definitely *celeusi*. Judging from the material which I revised and verified myself, the distribution of *Capperia celeusi* is as follows: Bavaria (Regensburg), Thuringia (Kaltenberg), Austria (no further data), Switzerland (Engadin), Italy (Gomagoi in Alps), France (Hautes-Pyrénées), Croatia (Fužine), Serbia (Deliblat), Hungary (Budafok), Poland (Lwów and Dniestr Valley). Because some of the records in the literature appear erroneous (Schmidt, 1928; Romaniszyn, 1929), I cannot accept other published localities.

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[1] Vide *Capperia britanniodactyla* (Gregson).

[2] Vide *Capperia fusca* (Hofmann) forma nova *marrubii*.

3. **Capperia washbourni** sp.n.

(Pl. 10, fig. 8; Pl. 12, fig. 19; Pl. 15, fig. 33; Pl. 17, fig. 41)

Examined material:

1. Holotype. Male specimen from Syria (British Museum, London): 'Shar Deresy, Syria 1893, Leech (Nat. Coll.) 61527'; 'Walsingham Collection 1910–427'; 'Compared and agreeing with one named by Rag. *Oxypt. marginellus* Z.? but larger'; '*Oxyptilus marginellus* Z.?'; 'No. praep.: Ox. 88' (genit. praep.).
2. Allotype. Female specimen from Asia Minor (Magyar Nemzeti Muzeum Collection, Budapest): 'Asia min., Amasia 1888, Korb, kollari, coll. Eppelsheim'; 'No. praep. Ox. 107' (genit. praep.).
3. Paratype. Female specimen from Palestine (Deutsches Kolon. Museum Collection, Bremen): 'Jericho (Palästina), Lichtfang 30.iv.1930, leg. H. G. Amsel'; 'O. marginellus' (Rebel det.); 'No. praep. Ox. 101' (genit. praep.).

Capperia washbourni is of medium size for its genus. The wing spread of the male is 18 mm., the female 15 mm. (Palestine) and 17 mm. (Asia Minor). The ground colour of the wings is dark, chocolate-brown in the specimens from Syria and Asia Minor, a little lighter in the specimen from Palestine. The bands on the fore wings vivid white and very distinct. The fore margin of the fore wings on its lower side pure white. On the hind margin of the second feather of the hind wings, in the middle, the dark cilia are interrupted by white hairs. (A similar white mark, but less distinct, is present in some specimens of *celeusi* from Thuringia.) From *celeusi* it is distinguished by a different tuft of scales on the third feather of the hind wings. In this tuft, in *washbourni*, the dark scales on the fore margin of the feather do not reach its end as in *celeusi* and other allied species. The end part of the third feather in *washbourni* is completely white on its fore margin.[1]

Male copulatory apparatus similar to *celeusi*. It differs from *celeusi* in the form of the valva, which in *washbourni* is nearly twice as wide in the distal half as in the basal. The ninth tergum pointed, without an incision on the top. The aedeagus bilaterally symmetrical, similar to that of *celeusi* but a little thicker and a little less strongly curved. The ninth sternum large, ending with two pointed flaps which are a little shorter than in *celeusi*. This sternum is a little more convex ventrally than in *celeusi*. The female copulatory apparatus of the same kind as in *celeusi* and *britanniodactyla*, i.e. with the plate like a 'U' near ostium bursae. The asymmetrical top part of this plate is longer and narrower in *washbourni* than in related species.

The *early stages* and the food-plant are unknown.

Geographical distribution. Asia Minor, Syria, Palestine.

4. **Capperia ningoris** (Walsingham), 1880

Oxyptilus ningoris sp.n., Walsingham, 1880, *Pter. Calif. Oreg.*: 26, pl. 2, fig. 6.
Pterophorus ningoris Wlsm., Fernald, 1898, *Pter. N. Amer.*: 19–20, pl. 6, figs. 1–3.
Oxyptilus ningoris Walsingham, Meyrick, 1910, *Gen. Ins.* **100:** 7.
Oxyptilus ningoris Walsingham, Barnes & Lindsey, 1921, *Contr. Nat. Hist. Lep. Amer.* **4:** 305–307, pl. 41, fig. 7, pl. 49, fig. 6.

I have confined my examination of this species to the figures of the copulatory apparatus given by Fernald (1898) and Barnes and Lindsey (1921), and the figures of imagines given by Walsingham (1880) and Barnes and Lindsey (1921). These figures and descriptions agree with the external appearance of the Walsingham specimens in the British Museum.

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[1] The end part on the fore margin in *washbourni* is white, but never on the very top as in *Oxyptilus hoffmannseggi*.

The species is rather similar to *britanniodactyla* in its size and colour. The wing spread is 18–20 mm. The colour is dark-brown but with little greyish tint, so that *ningoris* is duller than *britanniodactyla.*

Male copulatory apparatus, as figured by the above-mentioned authors, is quite different from that of the nearest palaearctic species, i.e. *britanniodactyla* and *celeusi.* Aedeagus also strongly curved like an 'S', but ending without bifurcation. Valva much narrower in the basal half than in the end half, similar to that of *washbourni.* Female copulatory apparatus unknown.

Early stages unknown. Walsingham remarked that he probably collected this species on *Teucrium* sp., but he was not certain.

Geographical distribution. A North American species known from California. The record of Blackmore (1922) from British Columbia was probably erroneous because McDunnough (1926) does not cite this species from Canada.

5. **Capperia evansi** (McDunnough), 1923

Pterophorus evansi sp.n., McDunnough, 1923, *Canad. Ent.* **54:** 85–86.

Pterophorus evansi McD., McDunnough, 1926, *Rep. Ent. Soc. Ont.* **25:** 50.

Pterophorus evansi McD., McDunnough, 1927, *Trans. Roy. Soc. Can.*, sect. V, **1927:** 176, pl. 1, fig. 3.

Pterophorus evansi McD., McDunnough, 1935, *Canad. Ent.* **57:** 71–73.

I have had no opportunity for examining this species, but the descriptions and figure given by McDunnough have made it possible to put *evansi* in its proper systematic position. McDunnough described *evansi* as similar in size and colour to *tenuidactyla* Fitch. It is a small species (wing spread 14 mm.), dark brown, but the brown is somewhat duller than in *tenuidactyla.* The features cited by McDunnough as separating *evansi* from *tenuidactyla* (colour, structure of palpi and of legs, and form of the second lobe of fore wing) are generic features distinguishing the genera *Geina* and *Capperia* and not especially the two species.

The *male copulatory apparatus* (McDunnough, 1927, fig. 3) differs from that of any other species of *Capperia* in the form of its aedeagus. The aedeagus is curved like an 'S' but very thin and very strongly broken in bends. The valva, ninth tergum, and sternum in McDunnough's figure seem to be similar to *britanniodactyla* or *celeusi.* At the end of the valva a process similar to that of *trichodactyla* is present.

The morphology and habits of the early stages are described by McDunnough (1935). *C. evansi* appears in two generations. The imagines appear at the beginning of June, and again from the middle of July till the beginning of August. McDunnough gives also some ecological data.

The larvae feed on *Scutellaria* sp. and they have the same habit as *britanniodactyla* in damaging the main stem of the plant and making it droop. They are hidden amongst withered leaves.

The species is known from Canada only.

6. **Capperia trichodactyla** (Denis et Schiffermüller), 1775

(Pl. 10, fig. 7; Pl. 13, fig. 25; Pl. 14, fig. 26)

Alucita trichodactyla, Denis & Schiffermüller, 1775, *Schmett. Wien*, 145: (3).
Alucita trichodactyla, Denis & Schiffermüller, 1776, Ibid. 145: (3).
Phalaena Alucita trichodactyla, Hübner, 1790, *Beitr. zur Gesch. Schmett.* **2** (Nachtr): 109–110.
Alucita trichodactyla, Illiger, 1801, *Syst. Verz. Schmett. Wien. Gegend.* **2:** 130.
Alucita trichodactyla, Hübner, 1802–1805, *Gesch. Eur. Schmett.*: pl. 498, figs. 2–2*ab*.[1]
Alucita trichodactyla, Hübner, 1805–1813, *Samml. Eur. Schmett.*: pl. 4, fig. 18.[1]
Amplyptilia trichodactyla, didactyla, chrysodactyla Schiff., Hübner, 1826, *Verz. Bek. Schmett.*: 430, no. 4184 (partim).
Alucita didactyla Treitschke, Ochsenheimer, 1833, *Schmett. Eur.* **9:** 237–238 (partim).
Pterophorus didactylus Linn., Zeller, 1839, *Isis*, **32:** 275 (partim).
Pterophorus obscurus var. *b* = *Phalaena trichodactyla* mus. Schifferm., Zeller, 1841, Ibid. **34:** 793–794.
Alucita trichodactyla S.V., Zeller, 1841, Ibid. **34:** 882.
Oxyptilus leonuri sp.n., Stange, 1882, *Stettin. Ent. Ztg.* **43:** 514–516.
Oxyptilus leonuri Stange, 1886, Ibid. **47:** 285–286.
Oxyptilus leonuri Stange, Hofmann, 1896, *Ber. Naturw. Ver. Regensburg.* **5:** 119–121.
Oxyptilus leonuri Stange, Hedemann, 1897, *Verh. zool. bot. Ges. Wien*, **1897:** 2.
Oxyptilus leonuri Stange, Hofmann, 1898, *Ill. Zeit. Ent.* **3:** 308.
Oxyptilus leonuri Stange, Klemensiewicz, 1898, *Spraw. Kom. Fizyogr.* **33:** 189.
Oxyptilus leonuri Stange, Klemensiewicz, 1899, Ibid. **34:** 201.
Oxyptilus leonuri Stange, Klemensiewicz, 1901, Ibid. **35:** 99–100.
Oxyptilus leonuri Stange, Rebel, 1901, *Cat. Lep. Pal.* **2:** 71 (partim).
Capperia leonuri Stange, Tutt, 1907, *Brit. Lep.* **5:** 411.
Oxyptilus leonúuri [sic!] Stange, Spuler, 1910, *Schmett. Eur.* **2:** 324.
Oxyptilus leonuri Stange, Meyrick, 1910, *Gen. Ins.* **100:** 7.
Oxyptilus leonuri Stange, Rebel, 1911, *Ann. Naturh. Hofmus. Wien*, **25:** 397 (?).[2]
Oxyptilus leonuri Stange, Meyrick, 1913, *Lep. Cat.* **17:** 7 (partim).
Oxyptilus leonuri Stange, Schille, 1914, *Kosmos, Lwów*, **39:** 181.
Oxyptilus leonuri Stange, Rebel & Zerny, 1931, *Denkschr. Akad. Wiss. Wien*, **103:** 134 (?).[2]
Oxyptilus leonuri Stange, Hellen, 1931, *Notul. Ent.* **11:** 57 (?).[2]
Oxyptilus affinis sp.n., Müller-Rutz, 1933, *Mitt. Schweiz. Ent. Ges.* **15:** 553.
Oxyptilus affinis sp.n., Müller-Rutz, 1934, Ibid. **16:** 118, pl. 1, fig. 1.
Oxyptilus leonuri Stange, Toll, 1934, *Bull. Ent. Pologne.* **12:** 35 (?).[2]
Oxyptilus leonuri Stange, Toll, 1937, Ibid. **14–15:** 239 (?).[2]
Oxyptilus leonuri Stange, Osthelder, 1937, *Iris*, **51:** 106 (?).[2]
Capperia leonuri Stange, Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13:** 261.

In the group discussed below Denis and Schiffermüller distinguished three species, *didactyla* L., *trichodactyla* sp.n., and *chrysodactyla* sp.n., which are at present reckoned in three genera, i.e. *Geina*, *Capperia*, and *Oxyptilus*. However, Hübner synonymized all these species under the name '*trichodactyla* Schiff.' and put them under the same number (*Verz. Bek. Schmett.*, 1826, no. 4184). Hübner's use of the name *trichodactyla* is explained by him in his *Beiträge* as follows: 'Die andere nährt sich von den welken Blättern des Herzgespanns, ebenfalls im Lenze; ihren Sitz hat sie auf der untern Flache. Die welke Blätter erhält sie dadurch, weil sie den Stengel des Blattes zuvor fast abbeist, ehe sie etwas davon geniest. Daraus kommt die Ph. Aluc. Trichodactyla des Syst. Verz.' (*Beiträge zur Gesch. Schmett.* **2,** Nachtrag: 190–110, U, 1790). Then Illiger, in his new edition of *Wiener Verzeichniss*, combines the short description of Denis and Schiffermüller with the ecological data cited by Hübner and gives the following description: 'Braunes, weissgestrichtes Geistchen, A. trichodactyla. Raupe lebt von welken Blättern des Herzgespanns' (*Syst. Verz. Schmett. Wiener Gegend*, **2:** 130, no. 3, 1801).[1] In 1802–1805 Hübner published in his *Geschichte* coloured figures of the larva and pupa of *trichodactyla* and also its food-plant, *Leonurus*, illustrating the very characteristic damage. But the coloured drawings of imagines of *trichodactyla* published by Hübner in his *Sammlung* (1805–1813, figs. 9 and 18), without doubt belong to two species. Fig. 18[2] is *trichodactyla*, but fig. 9 (published also as *trichodactyla*) represents another species, namely, *chrysodactyla*.[3] Both figures are poor and inexact, and for that reason they were misunderstood and synonymized by later entomologists. Before Zeller revised this group the species belonging here were too difficult to separate, not only for Hübner himself, but also for other contemporary entomologists after Schiffermüller. Fabricius, who had seen Schiffermüller's collection,[4] the so-called Wiener collection, neglected the two newly described species *trichodactyla* and *chrysodactyla* (probably as forms not deserving names as separate species) and mentioned in his works only one species of this group, i.e. *didactyla* (1787, *Mantissa*, p. 258; 1794, *Ent. Syst.* **3:** pt. 2, p. 346). Hübner also had the opportunity to study Schiffermüller's collection, and the drawings published by Hübner correspond to Schiffermüller's specimens. Charpentier, who examined also Schiffermüller collection, published in 1821 his remarks on Schiffermüller's specimens and Hübner's corresponding drawings (*Die Zinsler, Wickler,* &c.: 174 et seq.). Charpentier, like Fabricius and Hübner, had some difficulty in distinguishing the three species. He stated that *didactyla*[5] in the Wiener collection agreed perfectly with *chrysodactyla*, and that *trichodactyla* also appeared to agree with *chrysodactyla*, and that 'this species'[6] was figured by Hübner (figs. 9 and 18) as *trichodactyla*. Hübner's incorrect synonymy was followed by others. However, Hübner did not properly use the earlier name when he synonymized *trichodactyla*, and for this reason he was corrected by Treitschke (1833), who put all the synonymy under the oldest name, *didactyla* L. In Treitschke's opinion the differences between figs. 9 and 18 of Hübner represented sexual dimorphism in *didactyla*. In Treitschke's description of *didactyla* are some ecological data and also the description of the pupa and the larva feeding on *Leonurus*. These data, of course, refer to *Capperia trichodactyla* Denis et Schiffermüller and not to *Geina didactyla* Linnaeus. Zeller tried to disentangle the synonymic difficulties in this group, but unfortunately did not know the species living on *Leo-*

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[1] The dates of Hübner's publications *fide* Hemming, 1937.

[2] The data bearing the sign '?' need verification; Rebel's determinations are particularly unreliable in this group; I have seen the specimen of *celeusi* from Poland, named by Rebel as *leonuri*; Hellen's record from Finland, an unusual far northern locality, needs verification also; the data of Toll (1934, 1937) and of Osthelder (1937) as concerning the imagines captured in lowland places, at the end of June and beginning of July, are probably erroneous.

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[1] Hagen (*Bibl. Ent.* 1862: 399) cited the date '1800'!

[2] Erroneously considered later by authors as *didactyla* L., which probably did not exist in the Weiner and Hübner collections.

[3] *Chrysodactyla* of Denis and Schiffermüller = *hieracii* Zeller.

[4] *Wiener Verzeichniss* was published by Denis and Schiffermüller, but the *Wiener Sammlung* belonged to Schiffermüller only.

[5] It seems quite certain that *didactyla* from the Wiener collection was not the Linnean *didactyla*. Most probably it was an *Oxyptilus* species later described by Zeller (*ericetorum* or *pilosellae*).

[6] Charpentier considered those three species as forms of the same species.

nurus. Because of this his efforts were not successful. Zeller knew *didactyla* only from the very short and unsatisfactory description of Linnaeus and he was not sure if the synonymic interpretation of Treitschke was correct or not. Zeller used the name '*trichodactyla* Hb.' for his own specimens of *Geina didactyla* Linnaeus, the life-history of which was unknown to him. His determination was based on the plates of Hübner's *Sammlung* because fig. 18 is really quite similar to the Linnean *didactyla*. Zeller, by his conscientiousness, perpetuated Hübner's mistake, although he was unaware of it, and used for *Geina didactyla* Linnaeus the name applicable to the *Leonurus*-feeder. Herrich-Schäffer followed in Zeller's footsteps, giving in his work a very accurate coloured figure of *Geina didactyla* Linnaeus, but under the name *trichodactyla*. Obviously, with such an interpretation, this name could not be kept very long. Wocke, in his *Catalogue* (1871), corrected the mistakes of Zeller and Herrich-Schäffer as Treitschke, in 1833, similarly corrected Hübner's synonymy. In this way the central European specimens of *Geina didactyla* Linnaeus regained their proper Linnean name, but at the same time two valid species were overlooked, namely, *trichodactyla* Denis et Schiffermüller and *chrysodactyla* Denis et Schiffermüller. One of them, *chrysodactyla*, was not only overlooked but was completely forgotten. The other one, *trichodactyla*, following Hübner, Treitschke, and others, has been incorrectly considered a synonym of *didactyla* Linnaeus until the present time (Rebel, 1901; Meyrick, 1913). One can also find some support in the publications of Zeller for the restitution of the name *trichodactyla* for the species feeding on *Leonurus*. In his description of *Pterophorus obscurus* Z., Zeller (1841) distinguished a 'var. *b*' and under it he put Schiffermüller's specimens named as *trichodactyla*. On p. 793, under the sub-title 'B. (10) 3. *Pteroph. obscurus* Zell.' there occurs after the description of species: '*Phalaena trichodactyla* mus. Schifferm. Var. b. digiti tertii medio albido', and farther on, p. 794: 'Das dritte Viertel dieser Feder ist öfters weisslich (var. *b*)', and farther, on the same page: 'Meine Exemplare habe ich bei Glogau gefangen oder aus der Puppe erhalten; ein oesterreichisches Exemplar befindet sich in Herrn Metzners Sammlung aus welcher es mir als neue Art zu Ansicht mitgetheilt wurde; ein anderes erhielt ich von Hrn Fischer v. Roeslerstamm aus der Wiener Gegend als *Phal. trichodactyla* der Schiffermuellerschen Sammlung.' On pp. 832–833, under the sub-title 'B. (12) 5. *Pteroph. trichodactylus* Hüb.', Zeller discussed his own specimens which he considered as identical with 'Hübn. Aluc. fig. 18 (fem.) *trichodactyla*'. This was a mistake, and as Zeller's description shows, it was *Geina didactyla* Linnaeus in his collection, not *trichodactyla*. On pp. 880–883 Zeller discussed the Plume-moths of the *Wiener Verzeichniss*. There on p. 881 under the sub-title '2–3. Al. chrysodactyla S. 320' occurs the following:

> 'Ein Exemplar aus der Wiener Gegend das ich vergleiche und das genau mit den Exemplaren der Schiffermueller'schen Sammlung übereinstimmen soll, ist ein mittelmässig grosser *Pter. hieracii*. Wie könnten aber, frage ich, die Verfasser des Verzeichnisses aus einer so wenig veranderlichen Art zwey machen? Wie könnten sie an der zweyten ''goldglänzende Querstriche'' sehen? Was gar kein Druckfehler seyn kann, da der name *chrysodactyla* eben dahin deutet. Unserer Art könnte man höchstens silberglanzende Querlinien beylegen. Dass ich mir in meiner Arbeit des Namens *chrysodactyla* enthalte, versteht sich von selbst.'

The above commentary, in spite of the intention of Zeller, explains what is meant by *chrysodactyla*, the name overlooked and forgotten by later systematists. It is simply a synonym of *Oxyptilus hieracii* Zeller. Further, in the same publication, on p. 882, under the sub-title '3. Al. trichodactyla' we find:

> 'F. v. Roeslerstamm's Worte in Manuscript sind: "Das Exemplar der Sammlung besteht nur noch aus einem Vorder- und einem Hinterfluegel, welche an einem Stueckchen Leib haengen. Es ist ausser der Kleinheit, selbst fuer das bewaffnete Auge in nichts von den beyden vorigen (*didactyla, chrysodactyla*) verschieden, und sind daher alle 3 als eine Art so lange anzunehmen, bis wir sichere Unterscheidungszeichen entweder im Schmetterlinge oder in der Raupe aufgefunden haben".—Ein als "genau Trichodactyla mus. Schffm." bezeichnetes Exemplar ist mein *Pteroph. obscurus*. Sollten die Verfasser des Verzeichnisses, ohne durch die frueheren Staende aufmerksam gemacht zu sehen, eine so schwer zu unterscheidende Art wirklich von *Pter. hieracii* unterschieden haben? Kaum glaublich! Ich lasse daher den Namen *Trichodactylus* der Huebner'schen *Al. trichodactyla* fig. 18, und schaffe dieser Schiffermueller'schen einen neuen *Pt. obscurus*.'

On p. 885 Zeller discussed Hübner's figures of *Alucita trichodactyla*. In Zeller's opinion fig. 9 is his *Pterophorus hieracii* and fig. 18 his *Pterophorus trichodactylus*. But Zeller's interpretation of fig. 18 is not correct because this figure represents the true *trichodactyla* (not known to Zeller) and not *Geina didactyla* Linnaeus (= *trichodactyla* Zeller). Clearly Zeller considered that his '*obscurus* var. *b*' was the same form that Denis and Schiffermüller described as *trichodactyla*. Of course the characters of '*obscurus* var. *b*' agree with the characters of the *Leonurus*-feeder. They are the generally dark colour and the white middle part of the third segment of secondaries. The small size of the specimen from the Wiener collection shows that it was a specimen of the summer generation of *Capperia trichodactyla*. The second generation, feeding on flower-shoots of *Leonurus*, gives imagines smaller than imagines of the spring generation living on the lower leaves of the plant. Most of the specimens of the summer generation I bred in the neighbourhood of Warsaw were of the size of *parvidactylus* (= *obscurus* Zeller). Besides, *trichodactyla* and *didactyla* have the middle part of the third feather white, a character possessed also by the south European forms not appearing in Austria: i.e. *Oxyptilus hoffmannseggi* Möschler and southern specimens of forma *marubii* of *Capperia fusca* Hofmann. This form is much brighter coloured and has nothing to do with the dark specimens discussed by Zeller. It is known to me only from two females from Yugoslavia and Greece. Possibly it is a distinct species or perhaps the form of *Capperia fusca* Hofmann that occurs also in Austria. But even in this case the specimen from the Wiener collection could not be *fusca* because the specimens of *fusca* from the mountainous environs of the Alps and Carpathians always have the third feather of secondaries completely dark, not white in the middle. Thus Zeller's remarks provide additional evidence that *trichodactyla* Denis et Schiffermüller is nothing other than the *Leonurus*-feeder the early stages of which were figured by Hübner (figs. 2*a*, 2*b*) and for which some ecological data and notes were given by Treitschke (1833) under the incorrect name *didactyla*. In this paper I correct the synonymic errors of Hübner and later systematists and restore the names of Denis and Schiffermüller as follows:

1. *Capperia trichodactyla* Denis et Schiffermüller (= *leonuri* Stange, = *affinis* Müller-Rutz).
2. *Oxyptilus chrysodactylus* (Denis et Schiffermüller) (= *hieracii* Zeller).

3. '*didactyla* Denis et Schiffermüller' is not the same as *Geina didactyla* Linnaeus, but a species similar to *chrysodactylus*, probably *ericetorum* or *pilosellae*, but this name is preoccupied by Linnaeus. From the statement of Laspeyres (1805) and of Charpentier (1921) it is apparent that the genuine *didactyla* of Linnaeus did not exist in Schiffermüller's collection. However, this species was known in the neighbourhood of Wien before the publication of Denis and Schiffermüller, as seen from the coloured figure of the unnamed *Pterophorus* published by Schaeffer in 1766 (*Icones Ins. Ratisb.*: pl. 93, fig. 7, 1766).

Oxyptilus affinis Müller-Rutz, described from Switzerland, is a synonym of *Capperia trichodactyla* Denis et Schiffermüller. Through the kindness of Mr. Müller-Rutz I received for examination two co-types of *affinis* (♂ and ♀) labelled as follows: '♂, *affinis*, Remüs, 17.vi.31, G.P.K. 19' and '♀ *affinis*, Remüs, 2.vii.31'. The preparation of the genitalia (GP. = *Genitalpräparate*) used in the description of the species (1934) was made from this male specimen. Mr. Müller-Rutz sent me also the drawings of the male copulatory apparatus with the following labels: '*Oxyptilus affinis* M.R., Remüs, Unt. Engadin, 17.vi.31 (1150 m.)' and '*Oxyptilus teucrii* Jordan, Ardez, Unt. Engadin 28.vi.21 (1400 m.)'. These drawings show without doubt that *affinis* Müller-Rutz equals *trichodactyla* Denis et Schiffermüller and *teucrii* Müller-Rutz equals *celeusi* Frey. I made a preparation from the other co-type of *affinis* (female) and the examination showed it was also *trichodactyla.* In external appearance the co-types of *affinis* do not differ from specimens from Poland (Lwów, leg. Klemensiewicz; Warszawa, leg. Adamczewski).

External appearance. Capperia trichodactyla Denis et Schiffermüller in the spring generation is larger; wing spread 17–20 mm. The co-types of *affinis* (also first generation, but appearing in mountains a few days later than in the lowland) were 18 mm. The summer generation is smaller, alar expanse 15–18 mm. The ground colour of wings is dark brown with very characteristic olive-coloured hue. This character permits easy separation from allied species. The light pattern on the wings is not pure white as in many other dark brown-coloured species of the genus *Capperia* but is slightly yellowish as in *C. lorana* (this feature agrees with Fuchs's description for *C. geodactyla*), but *lorana* is much smaller and more greyish coloured. The roundish tuft of scales is present on the tip of the third feather of the secondaries.

I have compared the *copulatory apparatus* of specimens from Poland and Switzerland and they are identical. Valva nearly of the same breadth at both ends. The flap on the valva projects towards the base of the valva. It is a quite large, elongate piece, rounded at the end. The end part of the valva bluntly cut off and provided with a small, shapeless processus at its ventral part. The aedeagus symmetrical, S-shaped, enlarged at the end part; the small incision present on its tip. The ninth tergum is pointed, large, covers the small tenth tergum which is joined with it. The ninth sternum completely covers the rest of the copulatory apparatus on the ventral side. Female copulatory apparatus similar to *C. fusca.* Ostium bursae having also a small rounded plate as in *fusca*, but the ostium is placed in the middle of this plate, not on the edge. This plate is surrounded with a much larger sclerotized ring than in fusca. The eighth sternum is wider and more bluntly ended than in *fusca.*

The following authors give data concerning the ecology and the morphology of the early stages of *trichodactyla*: Hübner (1790, 1802–1805), Illiger (1801), Treitschke (1833), Stange (1882, 1886), Hofmann (1896, 1898[1]), Klemensiewicz (1901). All agree with my own observations on the Polish specimens and concern only the species of *Capperia* feeding on *Leonurus cardiaca*. The habits of the larva are very interesting. The species appears in two generations. After hibernation the young larvae of the first generation gnaw off the top surface of the leaf-stalk causing one or more leaves to wither and hang loosely. Between the folds of these leaves the larvae hide during windy or rainy weather or while moulting. Sometimes they change there into pupae, but this seldom happens. They feed only when there is no wind or sun. During the month of May the larvae feed on the healthy top leaves, which they perforate. They feed to some extent on withered drooping leaves also. The green or brown pupae are free, nearly always attached head downwards to the leaf-stalks or main stem of the plant. The pupal stage is very short, lasting about ten days only. Imagines fly during the month of June and lay their eggs on flower-buds. The young larvae of the second generation feed inside the calyx, eating out its contents and spinning the lids closing the entrance to the calyx. As the larvae become larger they go out and feed openly on the buds and flowers. They are, however, scarcely visible because they are green, with greyish hairs and very slow moving and resemble parts of food-plant. The larvae feed mostly on the flowers, but sometimes they pass on to the small leaves of the flower-shoots and destroy these leaves, as do the spring generation. The development of the summer generation is very fast and in the middle of July one can see the freshly emerged imagines. They are on the wing until the beginning of August. The imagines live hidden and it is difficult to find them. They are not attracted by white light and because of this it is difficult to capture them with a lamp. In the month of August the young larvae appear. They feed on the leaves of the flower-shoots. By this time the plants are already fruiting and have become dry, and because of this the new larvae grow very slowly. When deprived of fresh food the larvae go down to the lower parts of the plant and with the advance of autumn prepare themselves for hibernation. A couple of times I have found larvae in September on freshly flowering shoots of *Leonurus* which probably were damaged in the spring and could not flower at the proper time but much later. These larvae were much larger than usual at this time and some of them were nearly full fed. Unfortunately I could not breed the imagines (third generation?) because all these larvae were parasitized by Braconids. The Braconids produced one clear-yellow cocoon for each Plume larva.

The existence of *trichodactyla* seems to be dependent upon the lime content of the soil where *Leonurus* grows. In sandy-clayey places near Warsaw *trichodactyla* appears only in places where the soil is artificially limed, as in farm-yards, hedges visited by poultry, in back-yards and rubbish-heaps, in dusty verges where the road surface is of limestone, around farm-buildings and lime-washed walls. In such places the larvae of *trichodactylus* were found. In nearby places, where the soil had had no addition of lime, no larvae of *trichodactyla* were found, although there was abundant growth of *Leonurus*. On the other hand, on the natural calcareous areas in the neighbourhood of Lublin (southern part of central Poland) *trichodactyla* was found everywhere on *Leonurus* even in deserted places where roads and buildings did not exist.

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[1] Excluding '*Ox. leonuri* var. *fusca*', which is a distinct species (vide *Capperia fusca* (Hofmann)).

Geographical distribution. Capperia trichodactyla Denis et Schiffermüller is recorded under various names from Poland, Switzerland, Germany, Austria, Hungary, Macedonia, and Finland. The appearance of this species in Poland, Switzerland, Germany, and Austria is doubtless. It is doubtful if *trichodactyla* really exists in Macedonia and Hungary. Rebel's determinations are particularly doubtful in this group. The recorded appearance of *trichodactyla* in Finland should be verified as it is unusual for this species to be found so far northwards. In Poland this species was recorded by Klemensiewicz from Lwów and I verified these data. I observed *trichodactyla* in Poland in the following localities: Inowrocław, Kruszwica (distr. Inowrocław); Podkowa-Leśna (distr. Błonie); Ożarów, Powsin, Obory, Służew, Ursynów (distr. Warszawa); Wał-Miedzeszyński, Dworzec-Wschodni (Warszawa City); Wola-Łychowska, Gośniewice, Jasieniec (distr. Grójec); Wałowice (distr. Kraśnik); Sławinek (distr. Lublin).

7. **Capperia fusca** (Hofmann), 1898

(Pl. 9, figs. 5, 5a; Pl. 11, fig. 14; Pl. 15, fig. 31; Pl. 19, fig. 54)

Pterophorus obscurus Zell., Frey, 1856, *Tin. Pteroph. Schweiz*: 410.
Oxyptilus obscurus Z., Frey, 1880, *Lep. Schweiz*: 429–430.
Oxyptilus leonuri Stange, Hofmann, 1896, *Ber. Naturw. Ver. Regensburg.* **5:** 120–121 (partim).
Oxyptilus leonuri Stange, var. *fusca* Hfm., Hofmann, 1898, *Ill. Zeitschr. Ent.* **3:** 339–340.
Oxyptilus leonuri Stange, v. *fusca* Hofm., Rebel, 1901, *Cat. Lep. Pal.* **2:** 71.
Oxyptilus leonúuri Stange, v. *fusca* Hofm., Spuler, 1910, *Schmett. Eur.* **2:** 324.
Oxyptilus leonuri Stange, Meyrick, 1913, *Lep. Cat.* **17:** 7 (partim).
Oxyptilus parvidactylus, Vorbrodt, 1931, *Iris*, **45:** 124 (partim).
Oxyptilus fuscus O. Hofm., Brinkmann & Amsel, 1936, *Mitt. Ent. Ver. Bremen*, **23:** 14 (?).
Oxyptilus leonuri Stange, f. *fusca* Hofmann, Lhomme, 1939, *Cat. Lep. France*, **2:** 178–179.

Examined material:

1. Female specimen from France (Coll. Hofmann, British Museum, London): 'Cotype', 'Z.6.6.97, Moulineaux, Gallia', 'Hofmann Coll., Walsingham Collection 1930–427', '*Oxyptilus leonuri* St. var. *fusca* Hfmn., Named by O. Hfm.', 'Praep. no. Ox. 110' (praep. genit.).
2. Female specimen from France (Coll. Hofmann, British Museum, London): '11.6.97', '*Oxyptilus leonuri* St. v. *fusca*, e. coll. Hofmann'.
3. Female specimen from France *ex* coll. Constant (Lhomme Coll., Le Carriol, France): 'T. 97, *leonuri* v. *fusca*, Moulineaux'.
4. Male Swiss specimen *ex* coll. Frey (British Museum Coll., London): 'Frey Coll. Brit. Mus. 1890–62', 'Zürich e. 1.', '1947/60' (praep. genit.). (This specimen and some others from the same series from Frey collection are determined in the British Museum as *Oxyptilus parvidactylus* Hw. (= *obscurus* Z.).)
5. Male specimen from Tatra Mts. (Mus. Zool. Polon. Coll., Warsaw): 'Tatry, Przysłup Miętusi (1150 m.), 4.viii.1936, leg. E. Świderski', 'praep. genit. no. Ox. 55.'
6. Female specimen from East Carpathians Mts. (Mus. Zool. Polon. Coll., Warsaw): 'Las Świniarki, distr. Kosów Pokucki (600 m.), 17.viii.1935, leg. S. Adamczewski', 'praep. genit. no. Ox. 75'.
7. Male specimen from East Beskid Mts. (in the Carpathians Mts.) (Physiographical Mus. Coll., Cracow): 'Pod Makowicą, ad Rytro (±600 m.) 14.viii.1903, leg. S. Klemensiewicz', 'praep. genit. no. Ox. 59.' (F. Schille det.: *Ox. leonuri* Stange.)

8. Female specimen from East Beskid Mts. (in the Carpathians) (Physiographical Mus. Coll., Cracow): 'Rytro, 189, 377, ex coll. F. Schille', 'Praep. genit. no. Ox. 61' (F. Schille det.: *Ox. parvidactylus* Hw.).
9. Male specimen from neighbourhood of Cracow (Mus. Zool. Polon. Coll., Warsaw): 'Dolina Bentkowska ad Ojców (±400 m.), 18.vii.1935, leg. A. Starczewski', 'Praep. genit. no. Ox. 97.'
10. Sixty-five specimens from neighbourhood of Cracow (Mus. Zool. Polon. Coll., Warsaw): 'Dolina Sąspowska ad Ojców, 30.vii.–12.viii.1942 ex larva, *Stachys alpina*, leg. S. Adamczewski'.
11. Male specimen from neighbourhood of Zawiercie (south Poland) (Mus. Zool. Polon. Coll., Warsaw): 'okolice Zawiercia, leg. M. Isaakowa, ex coll. L. & M. Masłowski'.

This species has been known since 1856 when Frey described its early stages but erroneously determined it as '*obscurus* Z.' and later (1880) as '*parvidactylus* Hw.' Hofmann (1896) was the first to observe that *fusca* was distinct from *parvidactylus*, but he wrongly considered it to be only a form of '*leonuri* Stange'. Subsequently Hofmann examined a series of bred specimens from northern France which were identical with Frey's specimens from Switzerland and on the basis of this material he described (1898) '*Oxyptilus leonuri* Stange var. *fusca* Hfm.', but he erroneously stated that the aedeagus of *leonuri* and of *fusca* were not distinct. This mistake of Hofmann's was continued by other entomologists until the present times. Only M. Hering has used the name '*Oxyptilus fuscus* O. Hofm.', in determining a specimen from Bassum near Brema, sent to him for determination by Amsel (Brinkmann and Amsel, 1936). I did not see this specimen, but it is possible that it was a form very similar to *fusca* but feeding on *Marrubium vulgare* (see *Capperia fusca* Hofmann, n. forma *marrubii*). This *Marrubium*-feeding form was bred by Glitz in Hanover (Rössler, 1881; Frey, 1886). For the correct determination of this specimen from Bassum one must know whether the food-plant of *C. fusca*, which is *Stachys alpina*, occurs in the neighbourhood of Brema. If, as is possible, this plant does not occur near Brema, then the specimen from Bassum most probably belongs to the form feeding on *Marrubium vulgare*, which is distributed in NW. Germany.

All examined specimens from Switzerland, France, and Poland, including also the original specimens of Frey and Hofmann, were very dark chocolate-brown coloured, tinted with reddish. It is this reddish tint that best separates it from *C. trichodactyla* (= *leonuri*), which is also dark brown in colour but with an olive tint. The white pattern on the wings of *fusca* is strongly reduced so that it seems to be uniformly dark. In general appearance *Capperia fusca* resembles the darkest forms of *Oxyptilus parvidactylus*. *C. fusca* is one of the smallest species in its genus, the wing span being 13–15 mm. The specimens of the summer generation are smaller than those of the spring generation. The ecological data and the descriptions of the early stages of Swiss and French specimens agree with my observations on the Polish material. Also the identical structure of the genitalia shows that all the material examined from central and western Europe belong to the same species.

Male genitalia. Valva nearly straight, ovally enlarged anteriorly (i.e. in the basal part) but narrowed posteriorly. The flap on the valva projecting towards its anterior end is vertically cut on the tip. The ninth tergum is pointed at the end. The ninth sternum large, strongly sclerotized, covering the rest of the copulatory apparatus on the ventral side. Aedeagus very characteristic, distinguishing *C. fusca* from all the species except *marrubii* which is very similar in form; it is strongly sclerotized, curved like an 'S', a bilaterally asymmetrical organ. On the right side, on the posterior part of aedeagus there is a very large vertical spine. *C. fusca* form *marrubii* has a similar structure, but its spine seems to be thicker. Female genitalia somewhat similar to *C. trichodactyla* but distinct. The end of the eighth sternum of *fusca* is more slender and not so large as in *trichodactyla*. The plate covering the ostium bursae is flat, round, with the ostium opening symmetrically at the base of the plate, while in *trichodactyla* the plate is formed like a ring asymmetrically placed on one side of the ostium.

Descriptions of the early stages have been given by Frey (1856) and by Hofmann (1898). Specimens from Poland agree with these descriptions. The nearly fully fed larva is green, whitish hairy like *trichodactyla*, but it has a head which is black, not greenish with dark spots as in *trichodactyla*. Like other species of the genus *Capperia* it seems to be monophagous, feeding on *Stachys alpina*. (The taxonomic position of the form *marrubii* which feeds on *Marrubium* is not yet certain.) Larvae of *fusca* transferred to the closely allied *Stachys silvatica* died; they did not touch this food. The larvae appear twice a year. The spring specimens feed after hibernation on the stems and lower leaves, becoming full fed in the second half of May. The pupae are attached to the stems or below the leaves. The imagines appear in the first half of June. The larvae of the second generation become fully fed in the middle of July. They feed on the flowers, eating out the flower-buds, and change into pupae inside the calyx. The pupae are dark brown, nearly black, or green-brown coloured. The second generation of imagines emerges in the second half of July and in August. In southern Poland this species frequents shady beech forests growing on chalky ground (Jurassic rocks) where *Stachys alpina* occurs. It was observed in the Tatra Mts. at an altitude of 1,150 m., but in the Swiss Alps according to Frey it occurs up to 1,800 m. It has been recorded from northern France in the neighbourhood of Rouen. Lhomme (1939) cites it from French Alps and Pyrenees.

8. **Capperia fusca** Hofmann, nova forma **marrubii**

(Pl. 19, fig. 55)

Pterophorus dentellus Mann, Zeller, 1852, *Linn. Ent.* **6:** 354 (?).
Oxyptilus parvidactylus Hw., Rössler, 1881, *Jb. Nassau Ver. Naturk.* **33–34:** 222 (partim).
Oxyptilus parvidactylus Hw., Steudel & E. Hofmann, 1882, *Jh. Ver. vaterl. Naturk. Württemb.* **38:** 246.
Oxyptilus hieracii Z., Frey, 1886, *Stettin. Ent. Ztg.* **47:** 18 (partim).
Oxyptilus teucrii var. *celeusi* (Schmid) Frey, O. Hofmann, 1896, *Ber. Naturw. Ver. Regensburg.* **5:** 118 (partim).
Oxyptilus parvidactylus Hw., Reutti, Meess, & Spuler, 1898, *Lep. Baden*: 151 (partim).
Oxyptilus teucrii (Greening) Jordan, Reutti, Meess, & Spuler, 1898, Ibid.: 152 (partim).
Oxyptilus parvidactyla Hw. ab. *dentellus* (Mann) Zell., Tutt, 1907, *Brit. Lep.* **5:** 418.
Oxyptilus teucrii var. *celeusi* Frey, Spuler, 1910, *Schmett. Eur.* **2:** 325 (partim).
Oxyptilus fuscus O. Hofm., Brinkmann & Amsel, 1936, *Mitt. Ent. Ver. Bremen,* **23:** 14 (?).
Oxyptilus heterodactylus var. *celeusi* Frey, Lhomme, 1939, *Cat. Lep. France,* **2:** 179 (partim).

Examined material:

1. Male specimen from Württemberg, *ex* coll. O. Hofmann (British Museum, London): 'Urach, *Marrubium*', '1947/106' (praep. genit.) (in Hofmann coll. det. as '*teucrii* var. *celeusi* Schm.').
2. Male specimen from Württemberg, *ex* coll. O. Hofmann (British Museum, London): 'Urach, *Marrubium*' (in Hofmann coll. det. as '*teucrii* var. *celeusi* Schm.').
3. Female specimen from Croatia (British Museum, London): '*P. Dentellus* Mann = *obscurus*, Croatien, Gromnig', 'Frey coll., Brit. Mus. 1890–62', '1947/9' (praep. genit.).
4. Female specimen from Greece (Polish Museum of Zoology, Warsaw): 'Graecia (Tessalia), Tembi near Olimp Mt. 21.vii.1938, leg. S. Adamczewski', 'praep. genit. Ox. 116.'

Specimens of this form, feeding on *Marrubium vulgare*, were found for the first time by Glitz near Hanover (Rössler, 1881; Frey, 1886). I can trace no publication by Glitz himself. Rössler (1881) considered that Glitz's specimens were of a species distinct from *Oxyptilus parvidactylus* Hw. because of their distinct life-history, but he did not name this *Marrubium*-feeder. Steudel and E. Hofmann (1882) cited '*Oxyptilus parvidactylus* Hw.' from 'Urach am Wasserfall Juni, Juli, Herbst. Raupe im Spätsommer an den Blüthen von Marrubium'. Frey (1886) considered the specimens of Glitz from Hanover, of Schmid from Bavaria and of Jordan from England as *Oxyptilus hieracii*. In this way he united three different species of the genus *Capperia* feeding on different food-plants with a fourth species from another genus differing very much in its life-history. O. Hofmann (1896) cited the data published by his brother with Steudel (1882). Reutti, Meess, and Spuler (1898) in their description of the lepidopterological fauna of Baden erroneously recorded '*Marrubium* blüthen' as the food-plant of '*Oxyptilus parvidactylus* Hw.' and *Marrubium vulgare* and *Teucrium scorodonia* as food-plants of '*Oxyptilus teucrii* (Greening) Jordan'. Spuler (1910) mentioned *Teucrium chamaedrys* and *Marrubium peregrinum* as food-plants of '*Oxyptilus teucrii* var. *celeusi* Frey' from Württemberg and Bavaria. It is not clear why Spuler changed the commonly used name *Marrubium vulgare* to *Marrubium peregrinum* which had not been previously mentioned in lepidopterological literature. Lhomme (1939) recorded '*Oxyptilus heterodactylus* Vill. var. *celeusi* Frey' from a single locality in France and he cited (evidently taken from literature) as the food-plants of this form *Teucrium botrys*, *Teucrium chamaedrys*, *Marrubium vulgare*, *Marrubium peregrinum*. None of these statements has anything to do with *Oxyptilus parvidactylus* and all refer to some different species of *Capperia*. The specimens recorded from *Marrubium vulgare*, as was proved, had quite an asymmetrical aedeagus different from those of specimens from *Teucrium chamaedrys* and *T. scorodonia*, which belong to two *Capperia* species with a symmetrical aedeagus. I consider all the published records concerning the form feeding on *Marrubium vulgare* to refer to the distinct form *Capperia fusca* Hofmann, nova forma *marrubii*. Possibly it is a quite distinct species, but it needs further investigation. Specimens from *Marrubium peregrinum* were not examined, and it is not certain if such specimens ever existed. *Marrubium peregrinum* was mentioned as the food-plant of *celeusi* for the first time by Spuler (1910), but he said nothing about *Marrubium vulgare*, previously recorded by Rössler and Hofmann. It is very probable that Spuler, collecting data from the literature, changed the name only, and that his record of *Marrubium peregrinum* refers to *M. vulgare*. Lhomme's record of *M. peregrinum* was copied from Spuler. The specimen from Bassum near Brema which Hering named '*Oxyptilus fuscus* Hofm.' (Brinkmann & Amsel, 1936) probably belongs also to the form *marrubii* because it is doubtful whether *Stachys alpina*, which is the food-plant of typical *fusca*, occurs near Brema.

The description of the form *marrubii* is founded on two specimens from the collection of O. Hofmann labelled 'Urach, Marrubium' and placed under the name '*teucrii* var. *celeusi* Schm.' They are the specimens bred by E. Hofmann on *Marrubium vulgare*, mentioned by O. Hofmann (1896) and by Reutti, Meess, and Spuler (1898). The specimen of which the genitalia was examined (no. 1947/106) is designated as Holotype.

External appearance. Wing-span 14 mm. In shape and size *marrubii* is similar to typical *C. fusca*, but in colour it is nearer to *C. celeusi*. The ground colour of the wings is brown with a yellowish tint similar to the specimens of *celeusi* from Bavaria. The dark chocolate-brown colour with the reddish tint characteristic of *fusca* is absent in *marrubii*, so it is not very difficult to distinguish these two forms. From similarly coloured *celeusi*, *marrubii* differs in its more dumpy structure which is similar to that of *fusca*. The third feather of hind wing of *marrubii* is whitish in the middle, while in *fusca* this feather is completely dark. In the tuft of scales on third feather in *marrubii* the scales on the hind margin are longer than those on the fore margin, while in *fusca* the scales in the tuft are of the same length on both sides.

Male copulatory apparatus seen *in situ* is very similar to that of *fusca*. Aedeagus a little wider and thicker than in *fusca*. It is provided with the spine on the right side of its posterior part, but this spine seems to be a little thicker than in *fusca*. The ninth sternum is wider, not so slender as in *fusca*. The best distinguishing character in the genitalia is in the ninth tergum. It is dully rounded on the tip in *marrubii* but elongated and pointed in *fusca*.

Besides these specimens bred on *Marrubium* I found among some Balkan material two females with genitalia very similar to typical *fusca*. These females differed from *fusca* in their external appearance, being much more brightly coloured. The light pattern is more strongly developed than in *fusca* and the third feather is whitish in the middle. These females differ from the males bred on *Marrubium* in the greyish tint of their brown wings, and in the better developed light pattern on the wings. These specimens were taken in Greece and Croatia. The specimen from Greece was captured at Tembi in the same place as *C. hellenica*. It was darker than the second specimen from Croatia, originated from the Frey collection, and bore the old label '*P. Dentellus* Mann'. It is possible that it is one of the original specimens of Mann whose unpublished name *dentellus* was synonymized by Zeller with *obscurus* (1852). Only after examination of bred material from the Balkan countries will it be possible definitely to determine these two specimens. For the time being one can provisionally place them as the south European form of *marrubii*.

The early stages of *marrubii* are not known accurately. The larvae feed on flowers of *Marrubium vulgare* at the end of summer (Rössler, 1881; Steudel and E. Hofmann, 1882). The larva is probably similar to *celeusi*, i.e. green with the black head, if the brothers Hofmann who knew both forms did not notice any difference between them.

Geographical distribution. C. fusca Hofmann, nova forma *marrubii* is known certainly from western Germany: Hanover (Rössler, 1881, leg. Glitz) and Württemberg (Steudel and E. Hofmann, 1882). Its presence in the Balkan States is uncertain. Possibly it may occur in the neighbourhood of Brema (vide *C. fusca*) and in France (Lhomme, 1939).

9. **Capperia tamsi,** sp.n.

(Pl. 19, fig. 56)

Examined material:

1. Male specimen (Holotype) from Asia Minor (British Museum, London): 'Alma Dagh, Asia Minor, J., 06.'; *Oxyptilus ? marginellus* Z., E. Meyrick det. in Meyrick Coll.'; '1947/3' (praep. genit.).
2. Male specimen (Paratype) from Syria (British Museum, London): 'Shar Deresy, Syria 1893, Leech, Nat. Coll. 61529'; 'Walsingham Collection 1910–427'; '1947/7' (praep. genit.) (det. in the British Museum Coll. as '*Ox. tristis* Z.').
3. Male specimen (Paratype) from Andalusia (British Museum, London): 'Andalusia, Staudinger nr. 621, 6.ii.1895, nr. 6169'; 'Walsingham Collection 1910–427'; '*Oxyptilus hoffmannseggi* Möschl., named by Stgr.'; '1947/14' (praep. genit.) (det. in the British Museum Coll. as '*Ox. marginellus* Z.').

This species was discovered whilst studying the material of *Capperia marginella* Zeller and *Oxyptilus hoffmannseggi* Möschler. These two species, although belonging to different genera, were synonymized, and series of various species determined with these names form a strange mixture in many collections. Before describing *Capperia tamsi* I must give some notes on the names *marginella* and *hoffmannseggi* and their meaning. Above all they are not synonyms as Meyrick stated in his *Catalogue* (1913). *Capperia marginella* Zeller is known from Sicily only. All other examined material of *marginella* from various collections was wrongly named. *C. marginella* belongs to the group of species in the genus *Capperia* having asymmetrical male genitalia. In spite of the great similarity in the external appearance *Capperia tamsi* belongs to the other group with symmetrical genitalia and has nothing to do with *C. marginella*. *Oxyptilus hoffmannseggi* Möschler is even more distinct and completely different from both *marginella* and *tamsi*. Möschler described this species from Andalusia and gave some very characteristic particulars. He wrote: 'der Afterbüschel braun, weiss gemischt' and 'die drei Lappen der Hinterflügel dunkelroth braun, der hintere weiss bestäubt, vor der Spitze schwarzbraun beschuppt. Franzen graubraun in der Spitze des hinteren Lappens weiss.' and 'Unten der innere Lappen ganz weiss.' This description settles the correct position of *hoffmannseggi*: it is an *Oxyptilus* having the 'Afterbüschel' and also some other features agreeing very well with specimens belonging to *Oxyptilus*, not to *Capperia*. Specimens of the genus *Capperia* erroneously named as *hoffmannseggi* have the tip of their third feather always dark, not white. The specimens of *C. tamsi* also were confused with *hoffmannseggi* because they have the white scales on the tip of the third feather, but their cilia are dark on the tip, not white, as in *hoffmannseggi*. Möschler in his description cited the opinion of Wocke that specimens occur in S. France similar in appearance to the Spanish *hoffmannseggi*. I examined a specimen from Constant's collection (probably from S. France) named as *hoffmannseggi*, but it was *C. celeusi*. In the Walsingham collection I found a specimen labelled '*Ox. hoffmannseggi?* Millière, Cannes 1883'. This specimen (wing-span 15 mm.)

was an *Oxyptilus* similar to darker coloured specimens of *Oxyptilus parvidactylus* from central Europe; however, it has many white scales in the middle of its third feather as in *hoffmannseggi*, and on the tip of this feather there are also white hairs on the cilia but not so numerous as in *hoffmannseggi*. I did not see Möschler's types, but two specimens from Spain named by Staudinger as *hoffmannseggi*, which I examined, doubtless belong to this species, completely agreeing with Möschler's description. These specimens are in O. Hofmann's collection and labelled as follows: 'Castil. St. 85' and 'Hisp. Stgr. 98'. They are both *Oxyptilus*. Their male genitalia are similar to those of *parvidactylus* with very small second lobes of the valvae. These specimens are light brown coloured, pale, with a greyish tint. We find in the much darker coloured, dark brown specimens from Asia Minor and Syria again genitalia similar to the *parvidactylus* group. They might belong to *hoffmannseggi* or to allied but not yet distinguished species. Staudinger did not notice the differences between the forms belonging to *Oxyptilus* and to *Capperia* and named as *hoffmannseggi* also some *Capperia* species (as, for example, the specimen no. '1947/14' of *tamsi*). His publication of 1880 gives some very strange opinions. He synonymized *parvidactylus* with *hoffmannseggi* and *marginellus*. He doubts whether *maculatus* and *teucrii* are distinct, and even the distinctness of *hieracii*, *pilosellae*, and *ericetorum* seem to be doubtful to him. Rebel (1901) partially continued Staudinger's errors and he put *marginellus* in his catalogue with an interrogation mark as a species doubtfully distinct from *parvidactylus*; *hoffmannseggi* he considered as the synonym of *marginellus*. Meyrick (1913) considered *marginellus* as distinct from *parvidactylus*, but *hoffmannseggi* still remained as a synonym of *marginellus* in his opinion. It seems strange that neither author could separate these two species belonging to two distinct genera. In the Meyrick collection there are two specimens from Asia Minor from the same locality, named '*? marginellus*'. One of them is *C. tamsi* (no. 1947/3); the other is an *Oxyptilus* very close to the *hoffmannseggi* dark form discussed above. Caradja, discussing the species of this group (1920) from the Middle East countries (Amasia, Malatia, Erivan, Kasikoparan), did not mention *marginella* at all but only *hoffmannseggi*. Among this material there was an especially 'large form' resembling *maculatus* (in the opinion of Caradja, of course). In the Walsingham collection there is a series from Syria probably corresponding to the 'large form' of Caradja. One of these Syrian specimens was *C. tamsi* (no. 1947/7), but all the others belong to the above-mentioned dark form of *hoffmannseggi* (praep. genit. no. 1947/102). The wing-span of these specimens is 15–18 mm. This form is allied to *hoffmannseggi* and to *parvidactylus*. It may be small but sometimes is very large. Thus *Oxyptilus hoffmannseggi* and its as yet unnamed dark form occur in Spain, Asia Minor, and Syria. Maybe the above-mentioned specimen from southern France (Cannes) belongs here also. *Capperia tamsi* is known from the same countries as *hoffmannseggi*, but *C. marginella* has never been found in any of these countries.

External appearance. *Capperia tamsi* is of medium size in its genus. The wing-span 16 mm. (Syria), 17 mm. (Andalusia), 17·5 mm. (Asia Minor). It is dark brown in colour but differs in tone. The specimen from Andalusia shows a greyish tint, that from Asia Minor a reddish tint; the darkest one seems to be the specimen from Syria, but it is very worn. On the hind margin of the second feather of the hind wing there is a very distinct white spot in the middle of the cilia. On the tip of the third feather single white scales are present. The cilia at the tip of the third feather are dark, not white as in *hoffmannseggi*.

Male genitalia. Aedeagus strongly sclerotized. In comparison with the other species of the genus *Capperia* it is weakly curved like an 'S' and not much thicker in the middle than at both its ends. It is symmetrical and not bifurcated but straightly elongated at the posterior end. Valva strongly sclerotized, strongly arched, narrow near its base, but 2–3 times wider at its posterior end than at its base. The posterior half of the valva is strongly hairy on its inner surface. The folds and flaps of the valvae very weakly developed, projecting outside of valva and not folded on its surface as in other allied species. The ninth tergum weakly developed in the form of the triangular flap with pointed tip without incision. The ninth sternum short, not reaching farther than $\frac{3}{4}$ of the length of the valva. It is a very thick plate with some traces of its former vesicular structure (see genus *Procapperia*). The posterior part of this plate is bifurcate and bluntly cut at the tip; this top part is strongly hairy on its interior side. The genitalia of *C. tamsi* show a very interesting transition between the structure of the genus *Procapperia* and the more specialized and developed species of the genus *Capperia*. In connexion with this the structure of the valva, the ninth sternum and aedeagus is especially interesting. Female of *C. tamsi* is unknown.

Early stages and food-plant unknown.

Geographical distribution. Spain, Asia Minor, Syria.

10. **Capperia raptor** (Meyrick), 1908

Oxyptilus raptor sp.n., Meyrick, 1908, *Trans. Ent. Soc. Lond.* **40:** 478.
Oxyptilus raptor Meyr., Meyrick, 1913, *Lep. Cat.* **17:** 8 (partim ?).
Pterophorus raptor Meyrick, Barnes & Lindsey, 1921, *Contr. Nat. Lep. Amer.* **4:** 304–305, pl. 41, fig. 6; pl. 49, fig. 3.
Pterophorus raptor Meyr., McDunnough, 1926, *Rep. Ent. Soc. Ont.* **25:** 49.

I have not examined this species. It is classified in this place on the basis of the figure of the male genitalia given by Barnes and Lindsey (1921). From the descriptions of these authors, it appears they had not examined the Meyrick type of *raptor*; it should be verified that the male figured by them belongs to the same species as the Meyrick's type specimen, which is a female. The male copulatory apparatus figured by Barnes and Lindsey is most similar to that of *tamsi*. These two species form a group apart from all other species of *Capperia*. Valva with long pointed flap projecting beyond and not lying along the valva as in other species. Aedeagus without processes, curved like an 'S', but not so strongly as in other *Capperia* species. The ninth sternum bifurcate at its posterior end; the two parts of this bifurcation rounded at the tip, as in *tamsi*, and not pointed as in other species. The ninth tergum in the form of a triangular flap.

The *early stages* and the food-plant unknown.

Distributed only in northern America as follows: Colorado (Meyrick, Barnes, and Lindsey), Indiana (Barnes and Lindsey), Canada (McDunnough). Meyrick cited also (1913) California, but Barnes and Lindsey referred the Californian record to other species.

11. **Capperia hellenica,** sp.n.

(Pl. 16, figs. 35, 36, 37)

Pterophorus obscurus Zeller, 1847, *Isis*, **40:** 38.
Pterophorus marginellus sp.n. Zeller, 1847, Ibid. **40:** 904 (partim).

Examined material:

1. Holotype (♂) from Greece (Coll. Mus. Zool. Polon., Warsaw): 'Graecia, Tessalia, Tembi 21–25.vii.1938, leg. S. Adamczewski'; '*Capperia hellenica*, Adam., Holotypus, praep. genit. no. Ox. 109'.
2. Allotype (♀) from Greece (Coll. Mus. Zool. Polon., Warsaw): 'Graecia, Tessalia, Tembi 21–25.vii.1938, leg. S. Adamczewski'; '*Capperia hellenica*, Adam., Allotypus, praep. genit. no. Ox. 104'.
3. Five paratypes from Greece (Coll. Mus. Zool. Polon., Warsaw): 'Graecia, Tessalia, Tembi 21–25.vii.1938, leg. S. Adamczewski'.
4. Female specimen from Yugoslavia, *ex* coll. Schawerda (Coll. Kolon. Museum, Bremen): 'Hercegovina, Bišina, 11.viii., *marginellus* Z., Rebel det.'
5. Male specimen from Yugoslavia, *ex* coll. Meyrick (Coll. British Museum, London): 'Ragusa, Dalmatia, L., vii.07.'; 'near *Oxyptilus intercisus* Meyr., E. Meyrick det. in Meyrick coll.'; 'Meyrick Coll. B.M. 1938/290'; '1947/66' (praep. genit.).
6. Female specimen from Italy, *ex* coll. Walsingham (Coll. British Museum, London): 'Italy, Ps. de Grey'; 'Walsingham coll. 1910–427'; '1947/15' (praep. genit.), (det. in the British Mus. Coll. as '*marginellus* Z.').
7. Male specimen from southern France, *ex* coll. Millière (Coll. Brit. Museum, London): 'Cannes, S. France, Millière 188 . . .'; '*Ox. ericetorum* Z., Cannes, Millière'; '1/9'; 'Walsingham coll. 1910–427'; '1947/6' (praep. genit.) (det. in the British Mus. Coll. as near *leonuri* Stange).
8. Male specimen from France, *ex* coll. Millière (Coll. British Museum, London): 'Cannes, S. France, Millière, vii.1885'; '*Oxyptilus marginellus* Z.'; 'Walsingham Collection 1910–427'; '1947/11' (praep. genit.).
9. Female specimen from Asia Minor, *ex* coll. Zeller (Coll. Brit. Museum, London): '*marginellus* Z. Macri, Löw'; '*marginellus* Z., Cotype'; 'Zeller Coll., Walsingham Coll. 1910–427'; '1947/10' (praep. genit.).

Capperia hellenica is one of the smallest species in its genus. The wing-span is 10–14 mm. Probably specimens of the spring generation are larger. It is one of the lightest coloured species. The yellow-brown ground colour recalls *C. zelleri*. The tuft of scales on the third feather is rounded as in *C. zelleri*. The feathers of the fore wings are narrower and more delicate than those of *zelleri*, rather resembling those of *Procapperia croatica*.

Male genitalia. Valva strongly arched with rounded tip and more or less of the same width at the anterior and posterior ends. The flap on the valva projects anteriorly. It is elongated but rounded at the tip. Aedeagus curved like an 'S', symmetrical, without spines, processes, and bifurcations. It becomes narrower posteriorly and its tip is pointed as in the species of the genus *Procapperia*. The ninth tergum bluntly ended. The ninth sternum broad, ending with two pointed flaps reaching as far as the tips of the valvae. Female genitalia of *hellenica* approaching those of *Procapperia croatica*. Ostium bursae only strongly sclerotized near outlet. It is visible under the eighth sternum as a little rounded dark spot. The eighth sternum is in the form of a triangular flap elongated posteriorly and more strongly sclerotized at the tip.

The *early stages* and the food-plant unknown.

I captured the imagines of this species in Greece on herbs after sunset in a mulberry grove along the river Tembi near the village of the same name. Unfortunately the herbarium containing the specimens of the probable food-plants was destroyed during the war before determination.

Geographical distribution. South France, Italy, Yugoslavia, Greece, Asia Minor.

12. **Capperia lorana** (Fuchs), 1895

(Pl. 9, fig. 2; Pl. 12, fig. 21)

Oxyptilus obscurus Z., Rössler, 1866, *Jb. Nassau Ver. Naturk.* **19–20:** 263 (partim).
Oxyptilus parvidactylus Hw., Rössler, 1881, Ibid. **33–34:** 222 (partim).
Oxyptilus loranus sp.n., Fuchs, 1895, *Stettin. Ent. Ztg.* **56:** 48–50.
Oxyptilus teucrii (Greening) Jordan var. *celeusi* Frey, Hofmann, 1896, *Ber. Naturw. Ver. Regensburg.* **5:** 116–119, figs. 2, 9*ab* (partim).
Oxyptilus loranus Fuchs, Fuchs, 1897, *Stettin. Ent. Ztg.* **58:** 338–339.
Oxyptilus teucrii Jordan v. *loranus* Fuchs, Rebel, 1901, *Cat. Lep. Pal.* **2:** 71.
Capperia heterodactyla var. *loranus* Fuchs, Tutt, 1907, *Brit. Lep.* **5:** 272–275.
Oxyptilus loranus Fuchs, Spuler, 1910, *Schmett. Eur.* **2:** 325.
Oxyptilus heterodactylus de Villiers, Meyrick, 1910, *Gen. Ins.* **100:** 7 (partim).
Oxyptilus heterodactylus de Villiers, Meyrick, 1913, *Lep. Cat.* **17:** 7 (partim).
Oxyptilus loranus Fuchs, Hering, 1932, *Tierwelt Mitteleur.*, Ergänzb. **1:** 164.

Examined material:

1. Male specimen from Fuchs collection (Coll. Magyar Nemzeti Muzeum, Budapest): 'Bornich 23.7.97. Rieslingbg.'; '*loranus*, coll. Eppelsh.'.
2. Male specimen from Fuchs collection (Coll. Magyar Nemzeti Muzeum, Budapest): 'Lennig 16.6.1896, Rieslingbg.'; 'Bornich, Fuchs'; '*loranus*, coll. Eppelsh.'; 'praep. genit. Ox. 105.'
3. Specimen without abdomen from O. Hofmann coll. (British Museum, London): 'Bornich 12.7.95, Rieslingb.'; '*Loranus*, Fuchs' (probably one of cotypes, male, which genitalia were examined by Hofmann (1896)).

Capperia lorana Fuchs is easily distinguishable by its external appearance and also by the characteristic structure of the male genitalia. Unfortunately Hofmann (1896) published an erroneous observation that *lorana* and *celeusi* were identical in their genitalia and thus misled later entomologists. Subsequently this erroneous synonymy of Hofmann was accepted and perpetuated by Rebel (1901) and Meyrick (1910, 1913). Since the collection of Fuchs had been distributed amongst various collections (Horn, 1926), it was difficult to find the type of *lorana*. Looking through the collections of the Hungarian Museum in Budapest I found two original specimens of *lorana* labelled by Fuchs. In external appearance they agreed with his description. One specimen was of the spring generation (alar expanse 17 mm.) and the other of summer generation (alar expanse 15 mm.). In accordance with Fuchs's description these specimens were greyish coloured like *Oxyptilus tristis*, and had the bands and light pattern on the wings slightly yellowish and not pure white as have most species in the genus *Capperia*. This yellowish tint gives this species an appearance resembling that of *trichodactyla*; but by comparison it is smaller and more brightly coloured. In general appearance, however, *lorana* resembles most closely the grey form of *celeusi* from Podolia and Thuringia.

Male genitalia. The aedeagus is very characteristic. It is strongly curved like an **'S'**, heavily sclerotized and terminates with an asymmetrical plate provided with two big teeth. The valva is very contracted in the middle and is wider at the end than at its base. The flap on the valva projects in towards its base and is long, narrow, and rounded on the tip. The ninth tergum is triangular and bluntly ended posteriorly. The ninth sternum is narrow and strongly convex towards ventral side. It is bifurcated posteriorly in two long, pointed flaps, which reach to the end of the valvae. The female copulatory apparatus is unknown.

Capperia lorana is double-brooded. The *early stages* are unknown. Fuchs (1897) states that *C. lorana* in discrimination from *teucrii* does not live on *Teucrium scorodonia* but on 'a small plant which flowers in July'. Unfortunately he did not give the name of this plant.

Geographical distribution. Rhineland only.[1]

13. **Capperia marginella** (Zeller), 1847

(Pl. 10, fig. 13; Pl. 17, figs. 45, 46; Pl. 19, figs. 58, 59)

Pterophorus marginellus sp.n., Zeller, 1847, *Isis*, **1847**: 903–904 (partim).
Oxyptilus marginellus Z., Zeller, 1852, *Linn. Ent.* **6**: 355 (partim).
Oxyptilus marginellus Z., Herrich-Schäffer, 1855, *Schmett. Eur.* **5**: 372–373 (partim).
Oxyptilis marginellus Z., Wocke, 1871, *Cat. Lep. Eur.* **2**: 343, no. 3144 (partim).
Oxyptilus parvidactylus var. *marginellus* Z., Staudinger, 1880, *Horae Soc. Ent. Ross.* **15**: 425–427 (partim).
Oxyptilus ?marginellus Z., Rebel, 1901, *Cat. Pal. Lep.* **2**: 72 (partim).
Oxyptilus parvidactyla var. *marginellus* Z., Tutt, 1907, *Brit. Lep.* **5**: 419 (partim).
Oxyptilus marginellus Z., Spuler, 1910, *Schmett. Eur.* **2**: 324 (partim).
Oxyptilus marginellus Zeller, Meyrick, 1910, *Gen. Ins.* **100**: 7 (partim).
Oxyptilus marginellus Zell., Meyrick, 1913, *Lep. Cat.* **17**: 7 (partim).
Capperia marginella (Zeller), Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13**: 261.

Examined material of *Capperia marginella*:

1. Male specimen, type (Holotype), from Sicily (British Museum, London): '*marginellus* Z., Syrac. 23 Mai'; '*Oxyptilus marginellus* Z. Is. 47, 903, L.E. 6, 355'; 'Type H.T.'; '1947/1' (praep. genit.).
2. Female specimen (Allotype), from Sicily (British Museum, London): '*marginellus* Z., Syrac. 4 Mai'; 'Zeller Coll., Walsingham Collection 1910–427'; 'praep. genit. no. Ox. 87'.
3. Paratype specimen (probably male) from Sicily (British Museum, London): '*marginellus* Z., Syrac. 4 Mai'; 'Zeller Coll., Walsingham Collection 1910–427'.

List of examined specimens erroneously named in various collections as *marginellus* (the following data are given: correct determination, origin of specimen, who named it as *marginella*, from what collection):

1. *Procapperia croatica* Adam., Zengg-Croatia, det. Rebel, Kolonial Museum, Bremen.
2. *Procapperia anatolica* (Caradja), Amasia-Asia Minor, det. *ex* coll. Eppelsheim, Magyar Nemzeti Muzeum, Budapest.
3. *Crombrugghia distans* (Zell.), Asia Minor, det. *ex* coll. Eppelsheim, Magyar Nemzeti Muzeum, Budapest.
4. *Oxyptilus hoffmannseggi* Möschler, Alma Dagh, Asia Minor, det. Meyrick, British Museum, London.
5. *Capperia celeusi* (Frey), Regensburg, det. Zeller (vide Herrich-Schäffer, *Schmett. Eur.* **5**: 372).

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[1] Of course Rebel's statement (1916) that *Ox. teucrii loranus* occurs in 'Hungary' (Croatia, Zengg) cannot refer to *C. lorana* Fuchs. These specimens most probably were *Procapperia croatica*.

6. *Capperia washbourni* Adam., Shar Deresy, Syria, det. Walsingham, British Museum, London.
7. *Capperia washbourni* Adam., Jericho, Palestine, det. Rebel, Kolonial Museum, Bremen.
8. *Capperia fletcheri* Adam., Jerusalem, Palestine, det. Rebel, Kolonial Museum, Bremen.
9. *Capperia tamsi* Adam., Alma Dagh, Asia Minor, det. Meyrick, British Museum, London.
10. *Capperia hellenica* Adam., Bišina, Hercegovina, det. Rebel, Kolonial Museum, Bremen.
11. *Capperia hellenica* Adam., Macri, Asia Minor, det. Zeller, British Museum, London.
12. *Capperia hellenica* Adam., Cannes, France, det. ex coll. Millière, British Museum, London.
13. *Capperia hellenica* Adam., Italy, det. Walsingham, British Museum, London.
14. *Capperia zelleri* Adam., Sicily, det. Zeller, British Museum, London.
15. *Capperia maratonica* Adam., Haifa, Palestine, det. Meyrick, British Museum, London.

The above listed data include the specimens recorded as *marginella* in the publications of Staudinger (*Horae Soc. Ent. Ross.* **15:** 1880), Skala (*Ent. Z.* **13:** 1929), Amsel (*Veröff. Kolon. Mus. Bremen,* **1:** 1935), Lhomme (*Cat. Lep. France,* **2:** 1939), Barraud (*Entomologist,* **56:** 1923). Some of these specimens were probably already mentioned in papers by Rebel. In addition to the above-mentioned publications there are the following records of *marginella* which also require verification: Lebanon—Zerny, *Iris,* **48:** 1934; Macedonia—Rebel and Zerny, *Denkschr. Akad. Wiss. Wien,* **103:** 1931; Asia Minor—Rebel, *Ann. naturh. Hofmus. Wien,* **20:** 1906; Crete—Rebel, *Ann. Naturh. Hofmus. Wien,* **30:** 1916; Dalmatia—Rebel, *Jber. Wien. Ent. Ver.* **24:** 1914; Switzerland—Vorbrodt, *Iris,* **45:** 1931; and Müller-Rutz, *Schmett. Schweiz,* **2:** 1914. It is almost certain that the specimens determined as *marginella* and recorded in these publications are also erroneously named and have nothing to do with genuine *Capperia marginella* Zeller. It seems that *marginella* is endemic to Sicily, and this is an additional reason why the records of *marginella* from elsewhere are rather doubtful. For the time being one can accept the data from catalogues based on Zeller's publications only. However, neither those data nor Zeller's records of *marginella* refer exclusively to this species since Zeller included under this name some other species (see *zelleri, celeusi, hellenica*). Zeller in his descriptions gives differences between *marginella* and *obscurus* (= *parvidactylus*); but the characters he gives are generic and are not sufficient for distinguishing *marginella* from allied species of *Capperia.* The depth of the incision in the fore wings of *marginella* reaches nearly the middle of wing, as stated in Zeller's description, but in other species of *Capperia,* unknown to Zeller, the same feature appears. Another character of *marginella* given by Zeller is size and the colour of the spots in the cilia, but these vary considerably within a species and it is possible even to find specimens from two distinct species of *Capperia* with the spots in their cilia matching in pattern and colour. In Zeller's opinion *marginella* of southern Europe was the species which had become established and replaced *parvidactylus,* the latter species taking up a more northerly distribution. But in the light of further information it would now appear that his observations should be interpreted as the relationship between the genera *Capperia* and *Oxyptilus* and not to the two species, *marginella* and *parvidactylus,* alone.

Zeller described (1847) three females[1] (from Syracuse) 4, 4, 23 May 1843,[2] and one male from Catania (4 July), but only the specimens from Syracuse are genuine

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[1] There was only one female in this number, as the examination revealed.

[2] The exact date of capture was not mentioned by Zeller, but was given by Frey (*Stettin. Ent. Ztg.* **1883:** 415).

marginella. The specimen from Catania appears to be a different species (see *Capperia zelleri*). The specimen from Asia Minor (Macri) mentioned by Zeller in his description of *marginella* was different too (see *Capperia hellenica*). I could not find in Zeller's collection the specimen from Brussa (Asia Minor) recorded by him as *marginella*, but it is certainly another erroneous determination.

In external appearance *C. marginella* approaches to *C. celeusi*, but its copulatory apparatus is quite different. It is a medium-sized species of its genus. The wing spread 15–17 mm., female 16 mm. The colour of the wings is dark chocolate-brown. It seems to be darker than *celeusi* because the white pattern on the wings and on cilia is weaker. The tuft of scales on the third feather of secondaries is similar to that in *celeusi*.

Male copulatory apparatus. The aedeagus is strongly sclerotized, strongly curved like an '**S**' and bilaterally asymmetric. The top part of aedeagus ends with the plate rounded on one side and having three broad teeth separated by the shallow incisions on its other side. The valva is strongly sclerotized, nearly straight, and narrows towards the base. The flap on the valva projecting inwards is long and pointed. The ninth tergum is pointed. The ninth sternum is strongly sclerotized, bifurcate, and with its two pointed ends nearly reaches the tips of the valvae. Female copulatory apparatus possesses a large plate covering the ostium bursae. This plate is very regular and symmetrical and shaped like a shield.

The *early stages* and food-plant are unknown.

Geographical distribution. Sicily; there are only three specimens known, all collected by Zeller.

14. **Capperia zelleri,** sp.n.

(Pl. 9, figs. 3, 3*a*)

Pterophorus marginellus sp.n. Zeller, 1847, *Isis*, **40:** 903–904 (partim).
Oxyptilus marginellus Z., Zeller, 1852, *Linn. Ent.* **6:** 355 (partim).

Examined material:

1. The male specimen (Holotype) from Zeller Coll., one of 'paratypes' of Zeller's *marginella* (British Museum, London): '*marginellus* Z., Catan. 4 July'; 'Zeller Coll., Walsingham Collection 1910–427'; '*Oxyptilus marginellus* Z. ♂ Sicily'; '*Capperia zelleri* sp.n., Holotypus, S. Adamczewski det., praep. genit. nr. Ox. 89'.

The above-mentioned specimen is distinguished from the other paratypes of *Capperia marginella* by its small size, lighter colour, and also by the time and place of capture. The wing spread is 14 mm. The ground colour of the fore wings is light brown with a yellowish tint. The external appearance resembles that of *Procapperia croatica*, but the white pattern of *zelleri* is less distinct and not so vivid as in *croatica*. Also in the cilia of the hind margin of the fore wing in *croatica* there exist very distinct back tufts which are almost completely absent in *zelleri*. *Capperia zelleri* resembles also *hellenica* in its external appearance, but possesses much more black scaling inside the incision of the fore wings than does *hellenica*.

Male copulatory apparatus. Aedeagus strongly sclerotized, strongly curved like an '**S**', asymmetrical. The end part of the aedeagus asymmetrically flattened in the form of an irregular oval plate with numerous minute teeth on its larger end. Valva strongly sclerotized, arched, with the long and pointed flap projecting along the valva towards its base. The valva is twice as wide at its end as in basal part. The ninth tergum is pointed. The ninth sternum similar to that in *marginella*, with its two pointed ends reaching the tops of the valvae. The female unknown.

The *early stages* and food-plant are unknown.

Geographical distribution. Sicily. Only one specimen known.

15. **Capperia polonica,** sp.n.

(Pl. 9, fig. 1; Pl. 11, fig. 17; Pl. 17, fig. 42)

Examined material:

1. Holotype, male specimen from Sardinia (Mus. Zool. Polon. Collection, Warsaw): 'Aritzo, Sardegna, 14.vi.1933, Amsel'; '*Capperia polonica* sp.n., Holotypus, ♂, praep. genit. no. Ox. 85'.
2. Allotype, female specimen from Asia Minor (Mus. Zool. Polon. Coll., Warsaw): 'Turcia, ins. Büyük Ada ad Istanbul, 9–11.vii.1938, leg. S. Adamczewski'; *Capperia polonica* sp.n., Allotypus, ♀, praep. genit. no. Ox. 115'.
3. Paratype, male specimen from Sardinia (Kolon. Mus. Collection, Bremen): 'Aritzo, Sardegna, 14.vi. 1933, Amsel'.
4. Thirty-three paratypes, ♂ ♀, from Asia Minor (Mus. Zool. Polon. Coll., Warsaw): 'Turcia, ins. Büyük Ada ad Istanbul, 9–11.vii.1938, leg. S. Adamczewski' (praep. genit. ♂ nos.: Ox. 113, Ox. 114).

This is an intermediate-sized *Capperia* species. The specimens of the spring generation from Sardinia have a wing spread 18 mm. The specimens of the summer generation from Asia Minor are smaller, 14–16 mm. The ground colour of the wings is dark brown. The white pattern on the wings and cilia is strongly developed. The black pattern strongly contrasts with the white, giving this species a more variegated and lighter brown-coloured appearance than allied species. The specimens from Asia Minor have a little more black in the spot of scales of the third feather than the specimens from Sardinia.

Male copulatory apparatus. Valva slightly arched, twice as wide at the end as at its base. The flap on the valva projects along the valva towards its base; it is narrow and pointed. The ninth tergum elongated and blunt posteriorly. Two pointed ends of the bifurcate ninth sternum reach the tops of the valvae. The aedeagus is strongly sclerotized, strongly curved like an 'S', and asymmetrical. The end part of the aedeagus asymmetrically and bilaterally flattened in the form of a plate resembling a three-fingered paw of which the central finger is much longer than the lateral ones. The edge of this plate between the fingers weakly toothed. There are some individual differences to be found here. For example, some males from Asia Minor are toothed like the holotype from Sardinia, i.e. on one side of the central finger only (Ox. 113); another specimen from the same locality is toothed on both sides (slide no. Ox. 114).

The female copulatory apparatus is similar to that of *marginella*. Lamella antevaginalis and postvaginalis exhibit the large, strongly sclerotized shield of very regular shape resembling a triangle with rounded corners. On this shield is distinctly visible the wavy cut-out margin of the lamella antevaginalis.

The *early stages* unknown.

The imagines of *polonica* were captured by disturbing them in places overgrown with *Teucrium* in the thin forest of pine, or flying around *Teucrium*, and at rest on this plant at sunset. The food-plant of *polonica* belongs to the group of closely related species of *Teucrium* allied to *Teucrium chamaedrys* L. At this time these plants were in flower and resembled very much the flowering plants of *Teucrium chamaedrys* which I observed in the Dniestr valley. Unfortunately the herbarium containing these plants was destroyed during the war before a more accurate determination could be made.

Geographical distribution. Sardinia and Asia Minor (Prinkipo Is.).

16. **Capperia maratonica,** sp.n.

(Pl. 16, figs. 34, 38, 39, 40)

Examined material:

1. Holotype, male specimen from Greece (Mus. Zool. Polon. Collection, Warsaw): 'Graecia, Kato Suli ad Maraton (Athinai), 16–17.vii.1938, leg. S. Adamczewski'; 'Holotypus, ♂, praep. genit. no. Ox. 112, *C. maratonica* Adam.'
2. Allotype, female specimen from Greece (Mus. Zool. Polon. Collection, Warsaw): 'Graecia, Kato Suli ad Maraton (Athinai), 16–17.vii.1938, leg. S. Adamczewski'; 'Allotypus, ♀, praep. genit. no. Ox. 111, *C. maratonica* Adam.'
3. Thirteen paratypes, ♂ ♀, from Greece (Mus. Zool. Polon. Collection, Warsaw): 'Graecia, Kato Suli ad Maraton (Athinai), 16–17.vii.1938, leg. S. Adamczewski'.
4. Male specimen from Palestine (British Museum, London): 'Haifa, Palestine, 14.6.1920, P. J. Barraud, 1920–347'; '*Oxyptilus parvidactylus* Haw., teste Meyrick 371'; '1947/8' (praep. genit.).
5. Female specimen from Palestine (British Museum, London): 'Haifa, Palestine, 20.5.1920, P. J. Barraud, 1920–347'; '*Oxyptilus marginellus* Zell., teste Meyrick 287'; '1947/13' (praep. genit.).
6. Female specimen from Palestine (British Museum, London): 'Haifa, Palestine, 21.6.1920, P. J. Barraud, 1920–347'; '*Sphenarches caffer* Zell., teste Meyrick, 369'; '1947/59' (praep. genit.).
7. Female specimen from Croatia (Magyar Nemzeti Muzeum, Budapest): 'Dr. Hensch, Krapina Cro.'; 'Praep. genit. no. Ox. . . .'.

This is a medium-sized species of *Capperia*. The wing spread of the specimens from Palestine is 14 mm., and those from Greece 14–16 mm. The ground colour of the wings is dark brown. The external appearances of the allotypes of *maratonica* and *marginella* were carefully compared because of the similarity of their genitalia. *C. maratonica* is smaller and more delicately built than *marginella*. The wing feathers seem to be narrower in *maratonica*. The light pattern on wings in both species is white but more defined in *maratonica*. The dark scales reach the apex of the third feather of the secondaries in *maratonica* (as in *celeusi*), while in *marginella* the dark scales of the spot of scales do not reach the apex of the third feather. These small differences may be due to seasonal dimorphism, since the allotype of *maratonica* was captured in July while that of *marginella* belonged to the spring generation.

Male copulatory apparatus. The valva is as in *C. fletcheri*, strongly curved and twice as broad at the posterior part as at the base. The flap on the valva projects towards its base and is wide and bluntly cut at the end. The aedeagus is strongly curved like an 'S'. The end part of aedeagus is bilaterally flattened in the form of a plate ending with three large teeth. This plate is nearly symmetrical, a feature which is in contrast with the allied species, for example, *lorana*, *marginella*, *zelleri*, *polonica*, *fletcheri*, each of which has an asymmetrical aedeagus. The ninth tergum is elongated and ends with a pointed process. The ninth sternum is slender, bifurcate, and its two pointed ends extend to the ends of the valvae.

The female copulatory apparatus is of similar form to that of *marginella*. There is also the large shield covering the ostium bursae, but its construction is a little different. The fore margin of this plate shows some variability. The allotype (slide no. Ox. 111) and one of the Palestine specimens (no. 1947/13) have a small depression in this place, while the other specimen from Palestine (no. 1947/59) has the fore margin of the shield evenly rounded. The posterior part of eighth sternum in *maratonica* is more strongly sclerotized and darker than the corresponding part in *marginella* which is weak, membranous, and without such strong sclerotization.

The *early stages* and the food-plant are unknown.

C. maratonica appears in two generations and doubtless the larvae feed on a plant belonging to the Labiatae. The several specimens from Greece were all captured amongst weeds growing along the edges of ditches on the marshes near Kato Suli. If I remember correctly, amongst these plants were represented the genera *Mentha*, *Marrubium*, *Veronica*, and *Carex*. Unfortunately all herbarium material was destroyed during the war before the determinations could be made.

Geographical distribution. Greece (Attica), Yugoslavia (Croatia), Palestine.

17. **Capperia fletcheri,** sp.n.

(Pl. 9, figs. 4, 4a; Pl. 11, fig. 16)

Oxyptilus marginellus Z., Amsel, 1935, *Veröff. Kolon.-Mus. Bremen*, **1:** 258 (partim).

Examined material:

1. Holotype, male specimen from Palestine (Kolon. Mus. Collection, Bremen): 'Kirjat–Anavim, Jerusalem, 2.v.1930, leg. H. G. Amsel'; 'Praep. genit. no. Ox. 84.' (Rebel det.: *marginellus* Z.).

This is one of the two specimens recorded by Amsel from Palestine as *marginella* (for another specimen see *C. tamsi*). These specimens were not labelled with the name of determinator. Dr. J. Kremky informs me that Dr. Amsel determined his materials from Palestine in the autumn of 1930 himself; Dr. H. G. Amsel wrote me himself that they 'wurden mir in Wien als *marginellus* bestimmt'.

Capperia fletcheri is a medium-sized species of the genus *Capperia*. It is dark brown in colour. The wing spread 16 mm. The type is unique and in very poor condition, badly rubbed and not suitable for describing.

Male copulatory apparatus. The aedeagus is strongly curved like an 'S' and strongly thickened in the basal part. The end part of aedeagus is bilaterally asymmetric, flattened in the form of a plate which ends with three sharp-angled flaps. The valva is strongly curved, the posterior part of it twice as wide as at the base. The membranous piece projects along the valva towards its base and ends with a short, wide, and rounded flap. The ninth sternum is very narrow, bifurcate, and reaches with its two pointed ends to the ends of valvae. The female is unknown.

The *early stages* and food-plant are unknown.

Geographical distribution. Palestine (Jerusalem).

18. **Capperia geodactyla** (Fuchs), 1903

Oxyptilus geodactylus sp.n., Fuchs, 1903, *Stettin. Ent. Ztg.* **64:** 15.
Oxyptilus geodactylus Fuchs, Meyrick, 1910, *Gen. Ins.* **100:** 7.
Oxyptilus geodactylus Fuchs, Meyrick, 1913, *Lep. Cat.* **17:** 7.

The type of *geodactyla* has not been examined as Fuchs's collection was dispersed amongst various collections and I am unable to locate it. There is a possibility that the original specimens of *geodactyla* exist in the collections of Hinneberg, of Caradja, or of the Natural History Museum in Wiesbaden, none of which I have examined. Provisionally I am of the opinion that the type of *geodactyla* belonged to the genus *Capperia*, but this cannot be confirmed until the types or topotypes are examined. Fuchs (1903) gives a very detailed description of *geodactyla*, pointing out the distinctness of this species from *celeusi* and its similarity to *lorana*. In Hinneberg's opinion (*in litt.*, cited by Fuchs, 1903) *geodactyla* is identical with *celeusi*, but we know that Hinneberg was not very familiar with this group and even confused *Capperia celeusi* with *Oxyptilus parvidactylus* (Adamczewski, 1938). On the other hand, Fuchs was a reliable authority on the palaearctic Plume-moths; he distinguished *C. lorana* against the opinion of such an eminent authority as O. Hofmann. And so, not being able to find and examine any typical material of *geodactyla*, I presume it to be a good species and to have been correctly distinguished as such by Fuchs in 1903. It is possible that the examination of *geodactyla* will show it to be identical with one of the later described species. In any case the description of Fuchs allows us to put *geodactyla* into genus *Capperia*.

According to the original description *geodactyla* is a rather small species. The wing spread is about 14 mm. (the length of the fore wing 7 mm.). The colour grey with a yellow-brownish tint. The light pattern not pure white, but with the slight yellowish tint as in *lorana* and *trichodactyla*. The spot of scales on the third feather of secondaries is very weakly marked.

The *early stages*, habits, and food-plant are unknown.

Geographical distribution. Eriwan; Fuchs gives this Armenian locality without any additional data.

V. Genus OXYPTILUS Zeller, 1841.[1]

Generic type: *Oxyptilus pilosellae* Zeller, 1841.

Oxyptilus, Zeller, 1841, *Isis*, **34:** 765 (partim).
Oxyptilus, Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13:** 263 (partim).

The palpi with very prominent tuft of scales. The third feather of the hind wings with the spot of scales on its end. The lateral margin of the second lobe of the fore wings distinctly arched. On the end of abdomen very distinct tufts of hairs. The aedeagus tubular, weakly sclerotized, slightly arched, bilaterally symmetrical, not armed. The valva weakly sclerotized, built of two joints. The shorter, top segment is placed on the end of the basal segment, which is usually much longer. Bursa copulatrix with a signum. The species belonging here appear in a single generation and they are oligophagous, but feed on the plants of the family Compositae only.

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[1] The genera *Oxyptilus* Z. and *Crombrugghia* Tutt are taken into account only roughly here because all the relevant materials were destroyed during the war. The present outline should be regarded as the basis for further studies on these genera. In continuation some data are inserted about the nearest related but phylogenetically distinct group *Trichoptilus* sensu lato. This group of genera should be also carefully revised and separately elaborated. For the initiation of this work data concerning the *Trichoptilus* group, collected during the study of the *Oxyptilus* group, are added at the end of this systematic section.

The following species belong here:

1. *Oxyptilus pilosellae* Zeller, 1841, which is the generic type.

2. *Oxyptilus ericetorum* Stainton, 1851 (= *ericetorum* Zeller), described for the first time by Stainton (1851, *Suppl. Cat. Brit. Tin. Pter.*, Appendix: 28). His description was based on the original continental specimens received from Mann, and previously determined by Zeller. These specimens exist in the British Museum and both have the same labels: '27', '122', 'Stainton Coll., Brit. Mus. 1893–134', '*Pterophorus ericetorum* Z., teste Stainton'. The first description by Zeller of *ericetorum* appeared after Stainton's publication in 1852.

3. *Oxyptilus chrysodactylus* Denis et Schiffermüller, 1775 (= *hieracii* Zeller). This name was lost and completely forgotten in lepidopterological systematics. It belongs to the species described by Zeller (1841) for the second time as *hieracii*. The first description was very laconic and partially inaccurate because instead of the definition 'metallic shining bands' the incorrect expression 'gold shining' was used. Zeller's commentary (1841) on the original specimens from Vienna made it possible to fix the proper systematic position for '*Phalaena Alucita chrysodactyla*, W.V.' as the same as *hieracii* Z. (see above: *Capperia trichodactyla* D. & S.).

4. *Oxyptilus parvidactylus* Haworth, 1811 (= *obscurus* Zeller). This species, of variable colour, occurs in central Europe (Poland) in three forms living in different biotopes. They are a greyish-brown form from Podolia, an olive-brown form from Carpathian region, and a dark chocolate-brown form from the sandy plains of middle Poland. The systematic position of these forms needs further investigation. The appearance of this species in southern Europe and in the Middle East countries (from which it has been recorded) is also uncertain, because of its great similarity to some forms in the group of *Oxyptilus hoffmannseggi*. These matters need further study.

5. *Oxyptilus hoffmannseggi* Möschler, 1866. This species is sometimes confused with some *Capperia* species (see above: *Capperia tamsi*). There exists a group of forms in the Mediterranean countries which vary in their size and colour. Their systematic position is not yet completely clear.

6. *Oxyptilus bohemanni* Wallengren, 1862. This is a very little known northern European species recorded from Sweden and Holland. It is of the same size as *chrysodactylus* and differs from all other *Oxyptilus* species in its very characteristic colour. It is uniformly light brown in colour, almost without pattern. The only traces of pattern are present in the form of a slight paling of the ground colour on the fore wings in places.

7. *Oxyptilus delawaricus* Zeller, 1873. This is the only species of the genus *Oxyptilus* known from the Northern American region.

VI. Genus CROMBRUGGHIA Tutt, 1907

Generic type: *Oxyptilus distans* Zeller, 1847.
Oxyptilus, Zeller, 1841, *Isis*, **34:** 765 (partim).
Crombrugghia, Tutt, 1907, *Brit. Lep.* **5:** 449–451.
Oxyptilus, Adamczewski, 1939, *Ann. Mus. Zool. Polon.* **13:** 263 (partim).

The palpi with prominent tuft of scales. The spot of scales on the third feather of the hind wings very far placed from the tip of the feather (from one-third to the half of the length of the feather). The lateral margin of the second lobe of the fore wings distinctly arched. On the end of the abdomen there are present very distinct tufts of hairs. The aedeagus tubular, weakly sclerotized, slightly arched, bilaterally symmetrical, not armed. Valva weakly sclerotized, built of two long segments, which are usually of nearly the same length. The top segment is placed on the end of the basal one. Bursa copulatrix with a signum. The species belonging here appear in two generations a year. They are oligophagous but feed on the plants from the family Compositae only.

The following species belong to the genus *Crombrugghia*:

1. *Crombrugghia distans* Zeller, 1847, which is the generic type. It is a very variable species in size and colour. It has several forms, especially in southern Mediterranean countries. These forms are often confused with the related species *laetus* and *lantoscanus*. In the cooler central European area it is confused with *tristis*. The taxonomic value of all these forms needs revision and the ecological data should be taken into account. The high-mountainous form approaching *distans* is very interesting and most probably a distinct species. This form was observed for the first time in Poland in July 1937 in Kobaki, district Kosów Pokucki, in the East Carpathian Mts. This Polish specimen was of the size of a central European *distans*, pale, greyish-brown, less reddish, and a little larger than the specimens of *distans* from the plains in Poland. The main difference from *distans* was in its tuft of scales of the third feather, which is placed near its end nearly as in the species of *Oxyptilus*. Similar specimens from Switzerland (Saas, 6,000–7,000 feet) are present in Meyrick's collection, erroneously named as '*heterodactyla* Vill.' (see Pl. 12, fig. 64). Also in Walsingham's collection (British Museum) there exist similar specimens from Alpes-Maritimes (6,000 feet) named as *distans*. The specimens recorded by Frey (1880) from Swiss Alps (6,700 feet) under the name *distans* probably belong to the same form.

2. *Crombrugghia laetus* Zeller, 1847. This is a Mediterranean species very often confused with the preceding one. It is not easy to fix the systematic position of this species because Zeller's type is not in the British Museum.

3. *Crombrugghia lantoscanus* Millière, 1883. This species is known from southern France only. It is distinguished from larger and lighter coloured specimens of *distans* by the vivid yellow ground colour of its fore wings.

4. *Crombrugghia tristis* Zeller, 1839. This is the smallest species in this genus. It is greyish, light-brown coloured. It lives in central Europe in sandy places overgrown with *Hieracium*. It is recorded also from some Mediterranean countries, but these records should be verified.

5. *Crombrugghia kollari* Stainton, 1851. This is an Alpine species a little larger than *tristis*. It is very characteristically grey-whitish coloured, some specimens being almost white.

VII. Generic group TRICHOPTILUS sensu lato

The generic group most nearly related to *Oxyptilus* commonly passes as the genus *Trichoptilus* Walsingham. In this genus about thirty-five species have been described. Most of them were described by Meyrick, who erroneously synonymized *Trichoptilus* with the generic names *Stangeia* and *Buckleria*, distinguished by Tutt. Tutt (1907) erected these two genera for the European species *siceliota* Zeller and *paludum* Zeller. Amsel (1935) described in this group the genus *Megalorrhipida* for specimens of *defectalis* Walker from Palestine erroneously considered by him as a new species. However, this new generic name deserves to be kept in the systematics. In the group *Trichoptilus* s.l. as in the related group *Oxyptilus* s.l., there exist several, quite separate, evolutionary lines which are distinguished from one another by their morphological characters as well as by their geographical distribution and origin. The species *defectalis* Walker, very widely distributed as it is along the Equator, is the most primitive form in the group. Like the genus *Sphenarches* in the *Oxyptilus* group, *defectalis* possesses the most primitive structure of the copulatory apparatus in the group *Trichoptilus*. This species cannot be left in the genus *Trichoptilus* and the generic name *Megalorrhipida* may be accepted for *defectalis*. The generic type for the genus *Trichoptilus* Walsingham is the North American species *Trichoptilus pygmaeus* Walsingham, which has the well-developed tuft of scales on the third feather, valva well specialized, but not divided by joints, and aedeagus straight, slightly sclerotized (see Pl. 12, fig. 63). In this genus, of course, there is no place for *paludum* or *siceliota*. These two species are the representatives of two Euro-Indo-Australian genera *Buckleria* and *Stangeia* and are completely different both in structure and origin from the American genus *Trichoptilus*. The genus *Buckleria* Tutt has a weakly sclerotized and nearly straight aedeagus and the valva also weakly sclerotized and divided by joints. It takes the place in the group *Trichoptilus* corresponding with the place of the genus *Oxyptilus* Zeller in the group *Oxyptilus* s.l. A very strongly sclerotized and very specialized copulatory apparatus characterizes genus *Stangeia* Tutt. It corresponds to the genus *Capperia* in the preceding group. It has the valvae formed like very strong hooks, strongly curved. The aedeagus very strongly built, strongly sclerotized, armed with processes and asymmetrical horns at its end (see Pl. 12, fig. 62). These two genera call for redescription and placing afresh in the systematics of the generic group *Trichoptilus* s.l. I have not examined all the species belonging to this group and for that reason I do not know whether all its species could be placed in the four genera mentioned above. Probably it will be necessary to describe some further genera in this group especially for some American forms.

9. SUMMARY

The study of the generic group *Oxyptilus* s.l. is the subject of the present publication. This group contains six genera and forty-five species representing all the faunal areas. One new genus and nine new species are here described. Some forms from the generic group *Trichoptilus* s.l. have been partially taken into account for comparison. The group *Oxyptilus* is systematically revised on the basis of an analysis of its morphological characters. The group is formed of three smaller groups with two genera in each, namely, (1) *Sphenarches–Geina*, (2) *Capperia–Procapperia*, (3) *Oxyptilus–Crombrugghia*. Taxonomic analysis has shown that the synonymy found in this group by Meyrick was inconsistent. He distinguished the genus *Sphenarches*, but put into synonymy the genus *Geina* showing much larger morphological

specialization than *Sphenarches*. He also included genus *Geina* in the completely different genus *Oxyptilus*, though *Geina* is nearly related to *Sphenarches* which Meyrick had described himself.

Besides the morphological characters all the available ecological and distributional data have been comparatively examined. Special attention has been paid to the usefulness of ecological and zoogeographical data as complementary biosystematic features. It is proved that the forms in the group discussed arranged according to their biosystematic features correspond to the new systematic order based on the synthesis of the morphological characters. It is highly probable that a similar revision of the taxonomic value of systematic features made amongst other groups of insects would show a similar coincidence of the biosystematic and morphological features. It seems to be the best way to reveal the genuine systematics existing in nature.

The comparative analysis of all morphological and biosystematic characters leads to the opinion that in the *Oxyptilus* group there exist representatives of several differing evolutionary lines, derived from a common ancestor. The correlation of these findings with the thesis of the Taylor–Wegener theory of continental drift gives an opportunity for the reconstruction of the history of speciation in these evolutionary lines and provides an explanation of any particular geographical distribution. In this way one can also define the age of any evolutionary line in spite of the absence of fossils in this group. The analysis of all these data provides evidence that the ancestral form common to all these lines in the group under discussion is a still living form, the evolution of which ceased, and which has continued to exist in some areas since the Cretaceous. This may seem to be a very strange suggestion, but in the presence of the known facts, the author cannot find any other alternative explanation of the existing data. *Sphenarches anisodactylus* Walker is this ancestral form, very characteristic in its very primitive morphological and biosystematic features. This species has endured without any evolutionary changes for sixty million years in tropical territories where climatic conditions have not changed since the Cretaceous. One can find examples of checked speciation in other groups also, in which some fossils of recently living forms are found. Certain species of insects found in the Oligocene amber constitute similar existing proofs. The present wide distribution of *Sphenarches anisodactylus* and its presence on the islands and continents geographically isolated can only be explained along these lines. However, in some other regions the influence of climatic and other changes has resulted in the reactivation of the evolutionary ability in *anisodactyla* and initiated then new evolutionary lines in various territories and at various periods. The representatives of these lines are located in the genus *Sphenarches* or in the derivative genera of the *Oxyptilus* group according to their age and to the grade of modification of their morphological and biosystematical characters.

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PLATE 9

Fig. 1. *Capperia polonica* sp.n. Aedeagus: lateral view. Praep. no. Ox. 85. Holotype. (×70.)

Fig. 1*a*. *Capperia polonica* sp.n. Aedeagus: ventral view. Praep. no. Ox. 85. (×70.)

Fig. 2. *Capperia lorana* (Fuchs). Aedeagus: lateral view. Praep. no. Ox. 105. Cotype. (×70.)

Fig. 2*a*. *Capperia lorana* (Fuchs). Aedeagus: ventral view. Praep. no. Ox. 105. (×70.)

Fig. 3. *Capperia zelleri* sp.n. Aedeagus: lateral view. Praep. no. Ox. 89. Holotype. (×70.)

Fig. 3*a*. *Capperia zelleri* sp.n. Aedeagus: ventral view. Praep. no. Ox. 89. Holotype. (×70.)

Fig. 4. *Capperia fletcheri* sp.n. Aedeagus: lateral view. Praep. no. Ox. 84. Holotype. (×70.)

Fig. 4*a*. *Capperia fletcheri* sp.n. Aedeagus: ventral view. Praep. no. Ox. 84. Holotype. (×70.)

Fig. 5. *Capperia fusca* (Hofmann). Aedeagus: lateral view. Praep. no. Ox. 55. (×70.) (Carpathian Mts.)

Fig. 5*a*. *Capperia fusca* (Hofmann). Aedeagus: ventral view. Praep. no. Ox. 59. (×70.) (Another specimen from Carpathian Mts.)

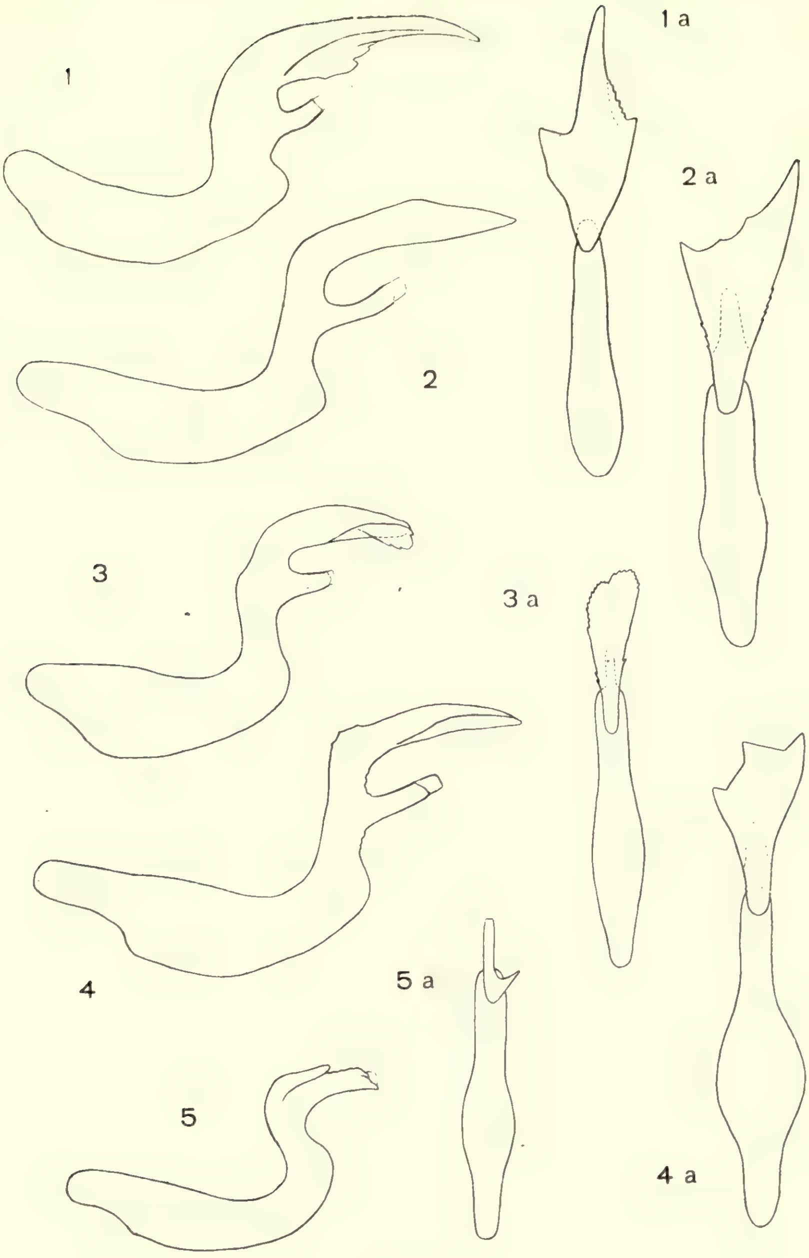
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PLATE 9

PLATE 10

Fig. 6. *Geina didactyla* (Linnaeus). Aedeagus: lateral view. Praep. no. Ox. 13. (× 70.) (Podolia—Dniestr Valley.)

Fig. 7. *Capperia trichodactyla* (Denis et Schiffermüller). Aedeagus: lateral view. Praep. no. Ox. 28. (× 70.) (Lwów.)

Fig. 8. *Capperia washbourni* sp.n. Aedeagus: lateral view. Praep. no. Ox. 88. Holotype. (× 70.)

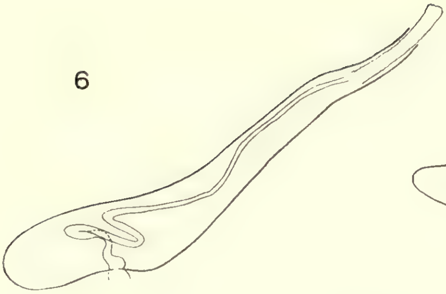
Fig. 9. *Capperia celeusi* (Frey). Aedeagus: lateral view. Praep. no. Ox. 30. (× 70.) (Podolia—Dniestr Valley.)

Fig. 10. *Capperia britanniodactyla* (Gregson). Aedeagus: lateral view. Praep. no. Ox. 73. (× 70.) (England.)

Fig. 11. *Procapperia croatica* sp.n. Aedeagus: lateral view. Praep. no. Ox. 83. Holotype. (× 70.)

Fig. 12. *Procapperia maculata* (Constant). Aedeagus: lateral view. Praep. no. Ox. 68. (× 70.) (S. France.)

Fig. 13. *Capperia marginella* (Zeller). VIII sternum, ostium bursae, and lamella antevaginalis. Praep. no. Ox. 87. Paratype. (× 70.)



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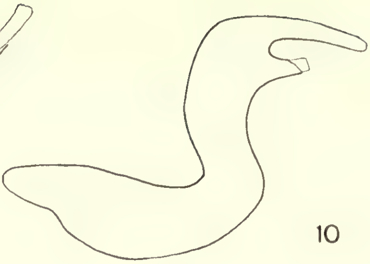

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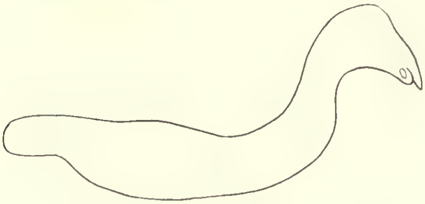

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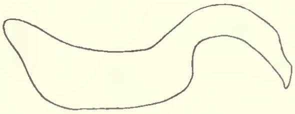

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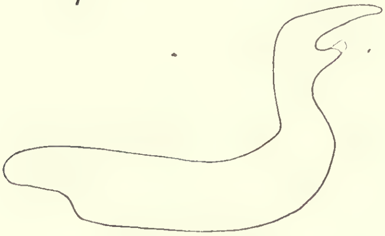

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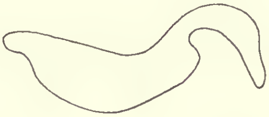

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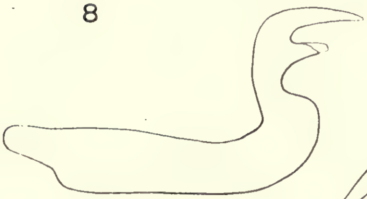

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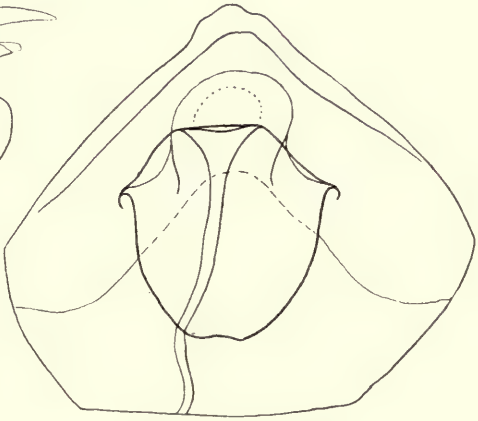

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Plate 10

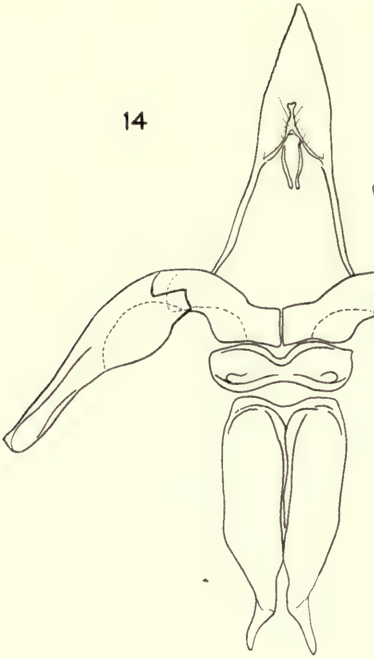
PLATE 11

Fig. 14. *Capperia fusca* (Hofmann). Valva, IX sternum, IX and X tergum. Praep. no. Ox. 55. (×30.) (Carpathian Mts.)

Fig. 15. *Capperia zelleri* sp.n. Valva, IX sternum, IX and X tergum. Praep. no. Ox. 89. Holotype. (×30.)

Fig. 16. *Capperia fletcheri* sp.n. Valva, IX sternum, IX and X tergum. Praep. no. Ox. 84. Holotype. (×30.)

Fig. 17. *Capperia polonica* sp n. Valva, IX sternum, IX and X tergum. Praep. no. Ox. 85. Holotype. (×30.)



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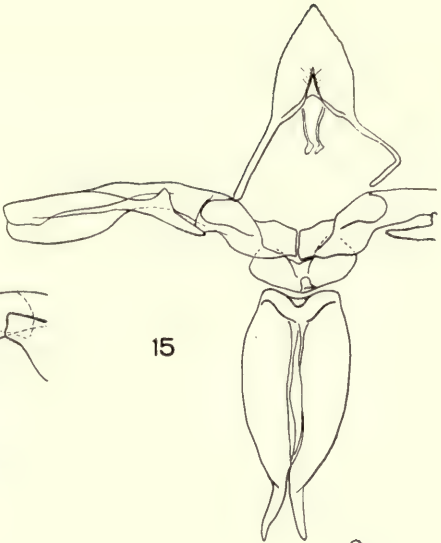

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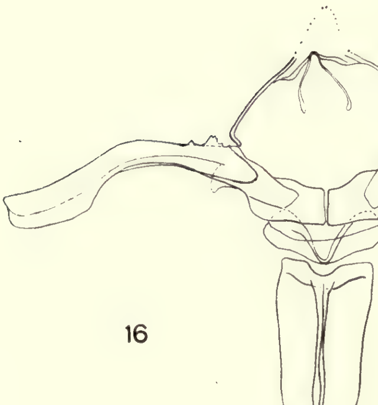

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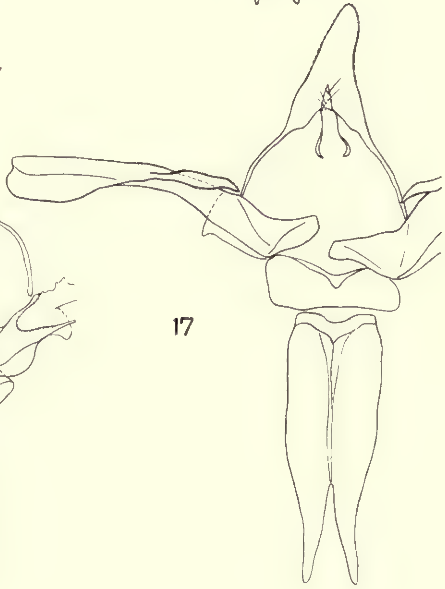

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Plate 11

PLATE 12

Fig. 18. *Procapperia croatica* sp.n. Valva, IX sternum, IX and X tergum. Praep. no. Ox. 83. Holotype. (× 30.)

Fig. 19. *Capperia washbourni* sp.n. Valva, IX sternum, IX and X tergum. Praep. no. Ox. 88. Holotype. (× 30.)

Fig. 20. *Procapperia maculata* (Constant). Valva, IX sternum, IX and X tergum. Praep. no. Ox. 68. (× 30.) (S. France.)

Fig. 21. *Capperia lorana* (Fuchs). Valva, IX sternum, IX and X tergum. Praep. no. Ox. 105. Cotype. (× 30.)

Fig. 22. *Capperia celeusi* (Frey). Valva, IX sternum, IX and X tergum. Praep. no. Ox. 30. (× 30.) (Podolia—Dniestr Valley.)

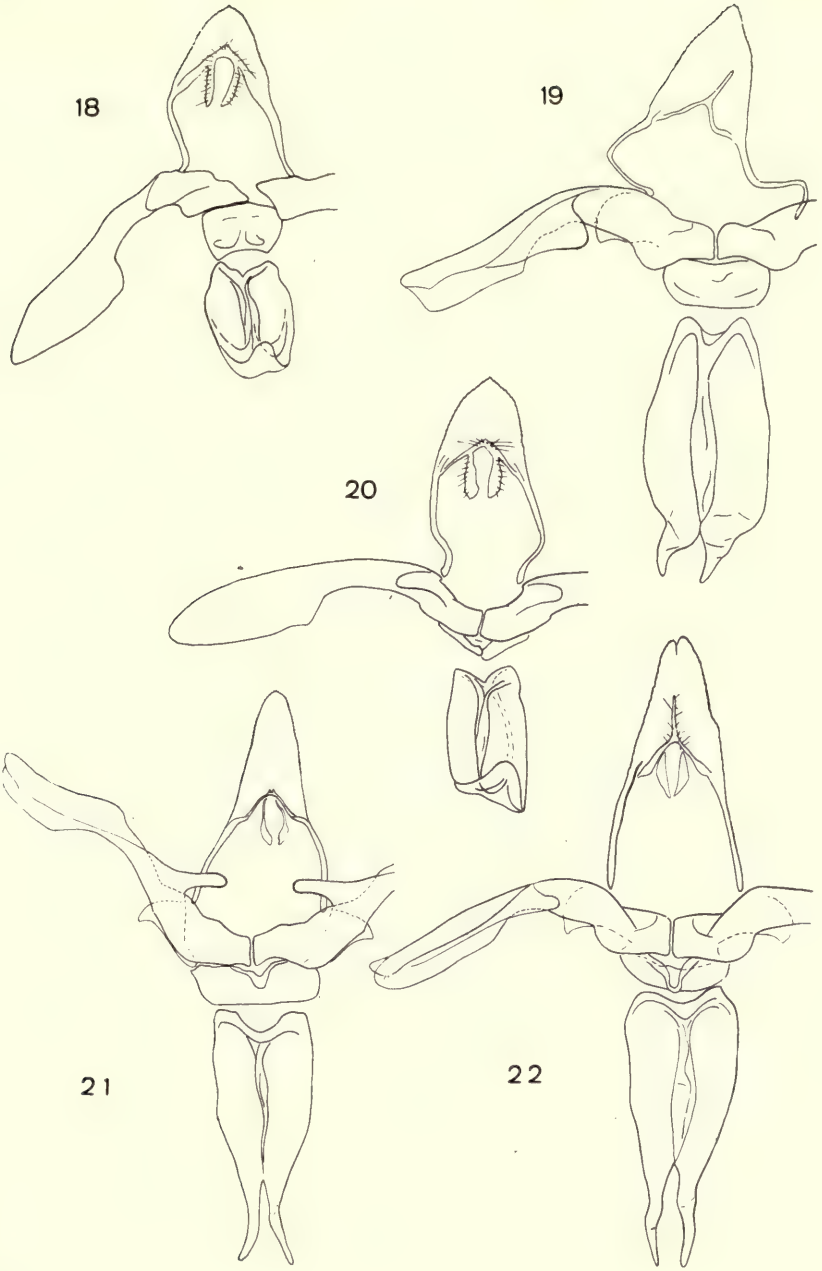
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PLATE 12

PLATE 13

Fig. 23. *Capperia britanniodactyla* (Gregson). Valva, IX sternum, IX and X tergum. Praep. no. Ox. 73. (×30.) (England.)

Fig. 24. *Geina didactyla* (Linnaeus). Valva, IX sternum, IX and X tergum. Praep. no. Ox. 13. (×30.) (Podolia.)

Fig. 25. *Capperia trichodactyla* (Denis et Schiffermüller). Valva, IX sternum, IX and X tergum. Praep. no. Ox. 28. (×30.) (Lwów.)

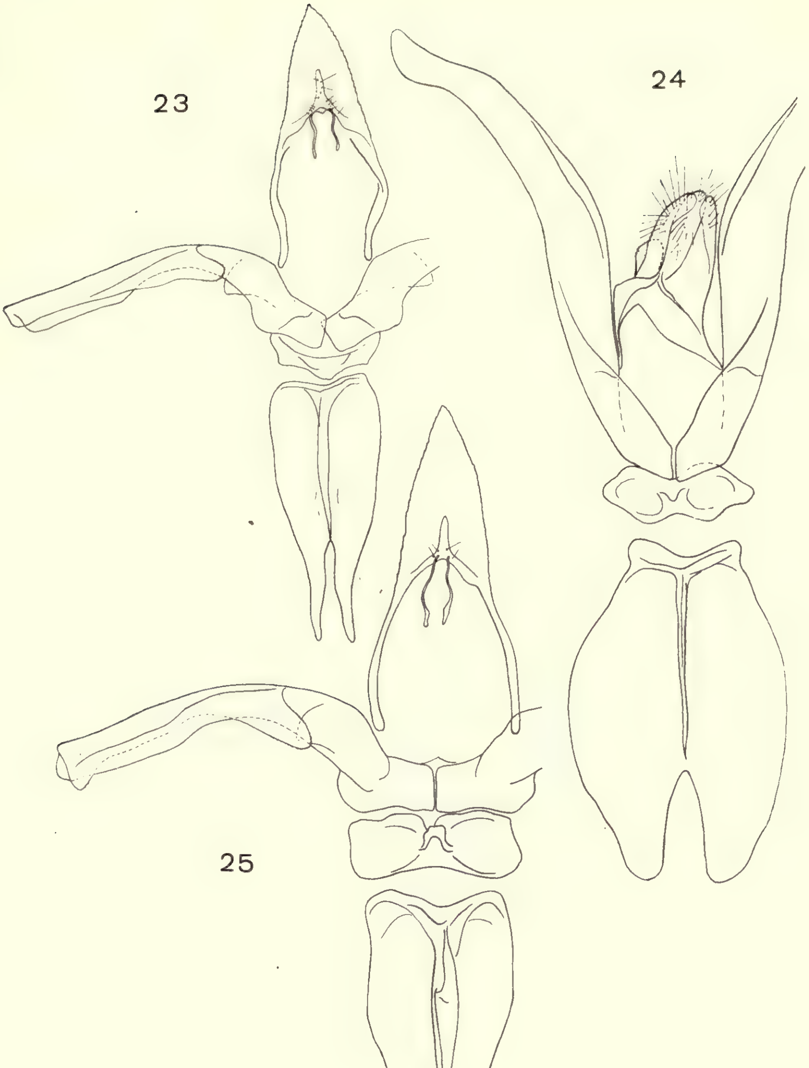


Plate 13

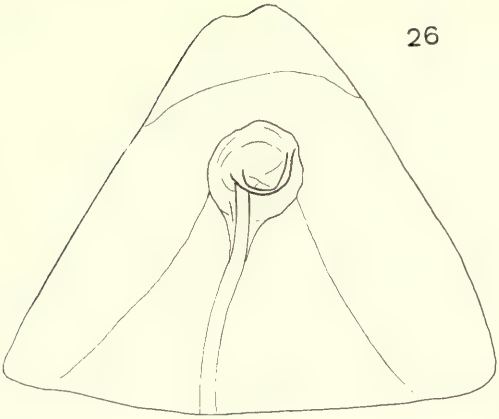
PLATE 14

Fig. 26. *Capperia trichodactyla* (Denis et Schiffermüller). VIII sternum and ostium bursae. Praep. no. Ox. 51. (×70.) (Lwów.)

Fig. 27. *Procapperia croatica* sp.n. Ostium bursae and VIII sternum. Praep. no. Ox. 100. Allotypus. (×70.)

Fig. 28. *Procapperia maculata* (Constant). Ostium bursae and VIII sternum. Praep. no. Ox. 102. (×70.) (Coll. Constant.)

Fig. 29. *Capperia britanniodactyla* (Gregson). Ostium bursae and VIII sternum. Praep. no. Ox. 77. (×70.) (England.)



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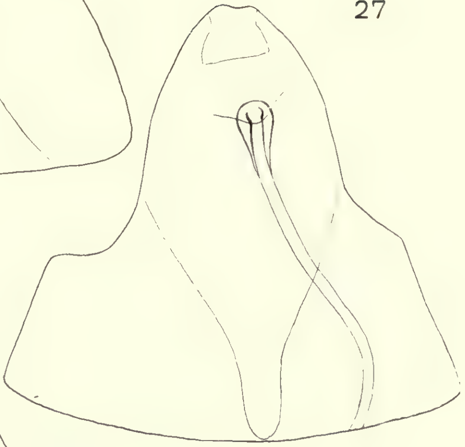

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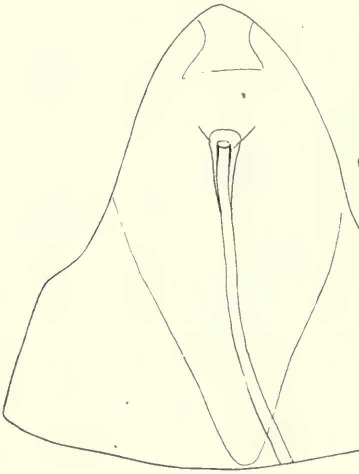

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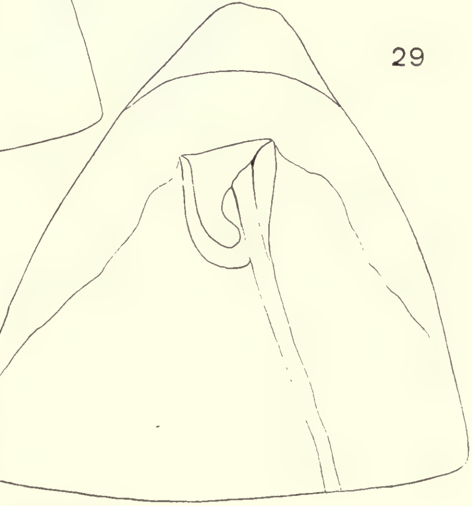

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Plate 14

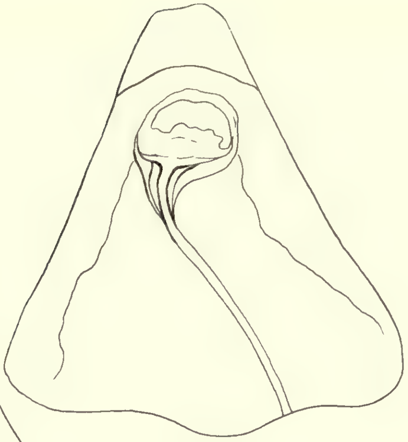
PLATE 15

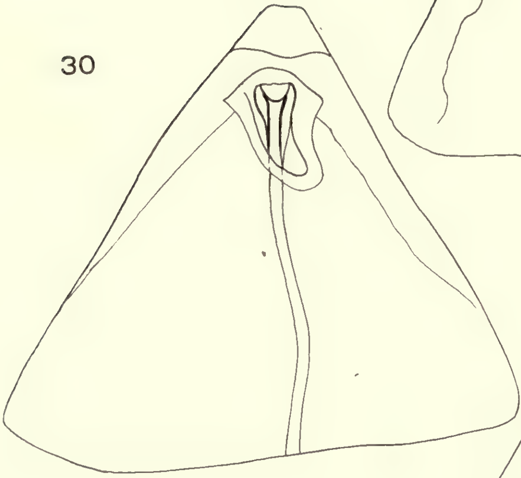
Fig. 30. *Capperia celeusi* (Frey). Ostium bursae and VIII sternum. Praep. no. Ox. 52. (×70.) (Podolia—Dniestr Valley.)

Fig. 31. *Capperia fusca* (Hofmann). Ostium bursae and VIII sternum. Praep. no. Ox. 75. (×70.) (Carpathian Mts.)

Fig. 32. *Geina didactyla* (Linnaeus). Ostium bursae and VIII sternum. Praep. no. Ox. 53. (×70.) (Lwów.)

Fig. 33. *Capperia washbourni* sp.n. Ostium bursae and VIII sternum. Praep. no. Ox. 101. (×70.) (Palestine.)





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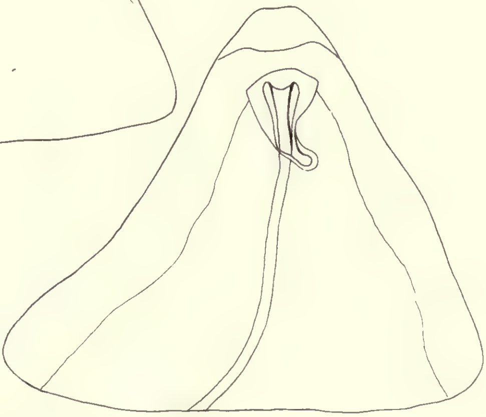

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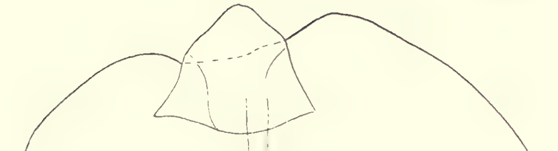

Plate 15

PLATE 16

FIG. 34. *Capperia maratonica* sp.n. Ostium bursae and VIII sternum. Praep. no. Ox. 111. Allotype. (× 70.)

FIG. 35. *Capperia hellenica* sp.n. Valva, IX sternum, IX and X tergum. Praep. no. Ox. 109. Holotype. (× 30.)

FIG. 36. *Capperia hellenica* sp.n. Aedeagus: lateral view. Praep. no. Ox. 109. Holotype. (× 70.)

FIG. 37. *Capperia hellenica* sp.n. Ostium bursae and VIII sternum. Praep. no. Ox. 104. Allotype. (× 70.)

FIG. 38. *Capperia maratonica* sp.n. Aedeagus: ventral view. Praep. no. Ox 112. Holotype. (× 70.)

FIG. 39. *Capperia maratonica* sp.n. Aedeagus: lateral view. Praep. no. Ox. 112. Holotype. (× 70.)

FIG. 40. *Capperia maratonica* sp.n. Valva, IX sternum, IX and X tergum. Praep. no. Ox. 112. Holotype. (× 30.)

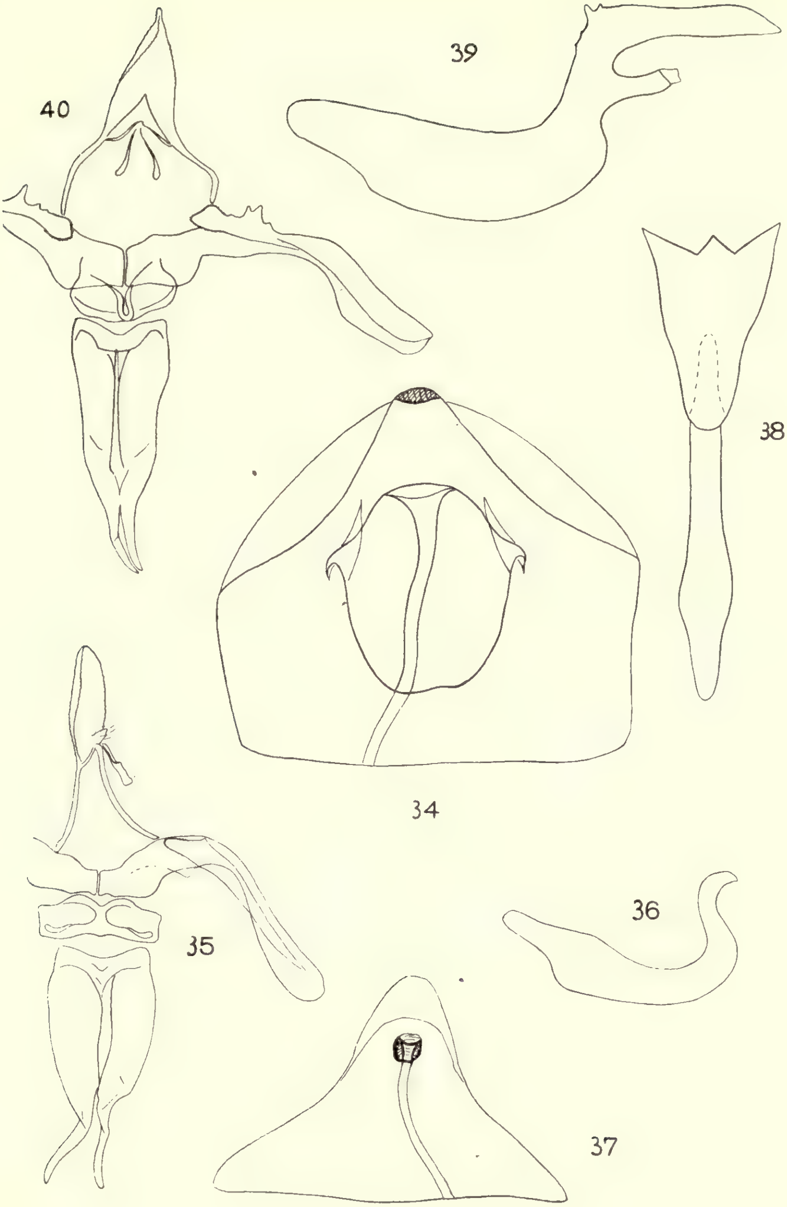
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Plate 16

PLATE 17

Fig. 41. *Capperia washbourni* sp.n. Ostium bursae and VIII sternum. Praep. no. Ox. 107. Allotype. (×70.)

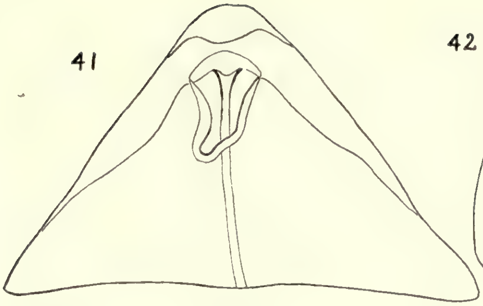
Fig. 42. *Capperia polonica* sp.n. Ostium bursae and VIII sternum. Praep. no. Ox. 115. Allotype. (×70.)

Fig. 43. *Capperia tamsi* sp.n. Aedeagus: lateral view. Praep. no. 1947/3. Holotype.

Fig. 44. *Capperia tamsi* sp.n. Aedeagus: ventral view. Praep. no. 1947/3. Holotype.

Fig. 45. *Capperia marginella* (Zeller). Aedeagus: lateral view. Praep. no. 1947/1. Holotype.

Fig. 46. *Capperia marginella* (Zeller). Aedeagus: ventral view. Praep. no. 1947/1. Holotype.



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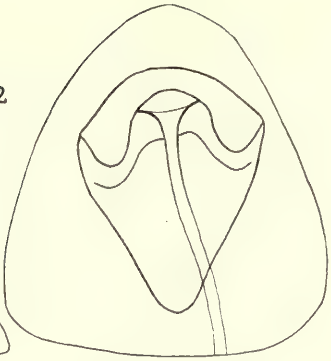

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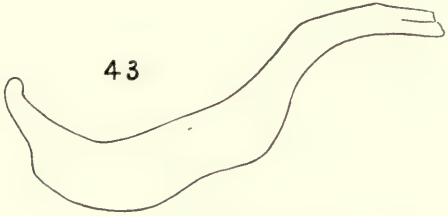

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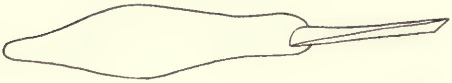

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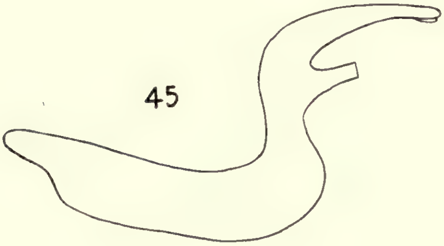

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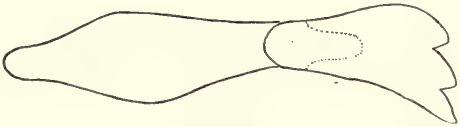

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Plate 17

PLATE 18

Fig. 47. *Sphenarches synophrys* Meyrick (= *anisodactylus* Walker). Male copulatory apparatus. Praep. no. 1947/54. Paratype. (New Hebrides.)

Fig. 48. *Sphenarches diffusalis* (Walker) (= *anisodactylus* Walker). Male copulatory apparatus. Praep. no. 1947/51. Type. (Moreton Bay, Australia.)

Fig. 49. *Sphenarches caffer* (Zeller) (= *walkeri* Walsingham). Male copulatory apparatus. Praep. no. 1947/52. (Natal.)

Fig. 50. *Sphenarches anisodactylus* (Walker). Male copulatory apparatus. Praep. no. 1947/50. Type. (Ceylon.)

Fig. 51. *Sphenarches zanclistes* (Meyrick). Male copulatory apparatus. Praep. no. 1947/101. (Assam.)

Fig. 52. *Sphenarches zanclistes* (Meyrick). Male copulatory apparatus. Praep. no. 1947/72. Lectotype. (Burma.)

Fig. 53. *Sphenarches anisodactylus* (Walker). Female copulatory apparatus. Praep. no. 1947/53. (Gambia.)

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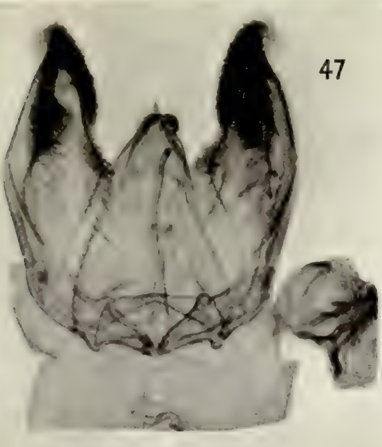
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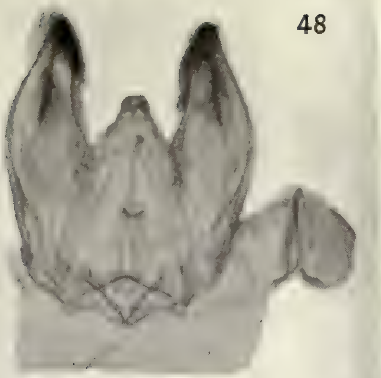
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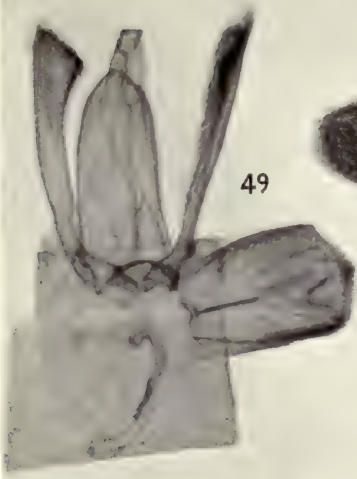
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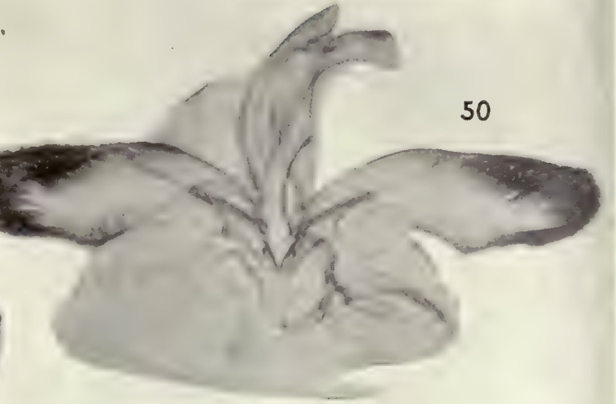
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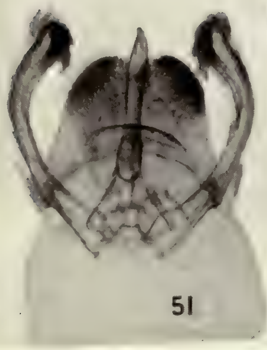
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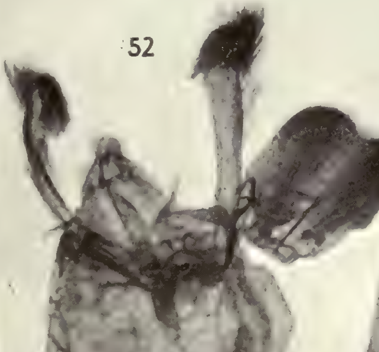
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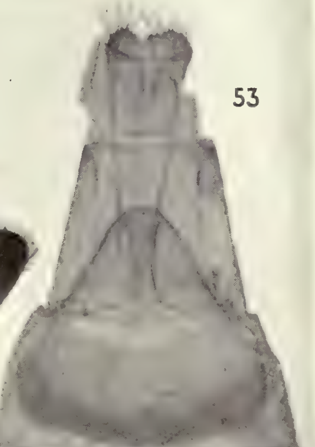
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PLATE 19

FIG. 54. *Capperia fusca* (Hofmann). Male copulatory apparatus. Praep. no. 1947/60. (Zürich; *ex* Frey coll.)

FIG. 55. *Capperia fusca* nova forma *marrubii*. Male copulatory apparatus. Praep. no. 1947/106. Holotype. (Urach.)

FIG. 56. *Capperia tamsi* sp.n. Male copulatory apparatus. Praep. no. 1947/14. Paratype. (Andalusia.)

FIG. 57. *Capperia britanniodactyla* (Gregson). Male copulatory apparatus. Praep. no. 1947/107. (Hartwald in Baden; *ex* coll. O. Hofmann.)

FIGS. 58–59. (The same specimen in two positions.) *Capperia marginella* (Zeller). Male copulatory apparatus. Praep. no. 1947/1. Holotype. (Sicily.)

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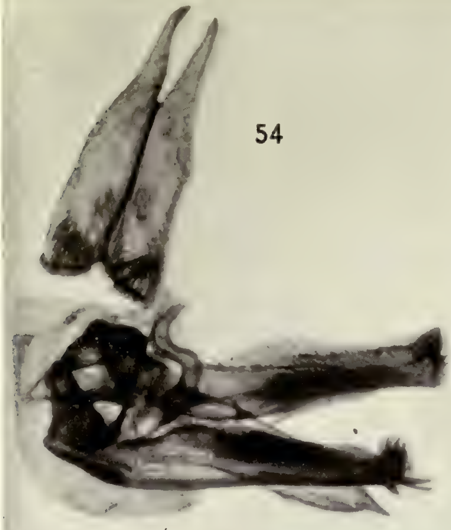

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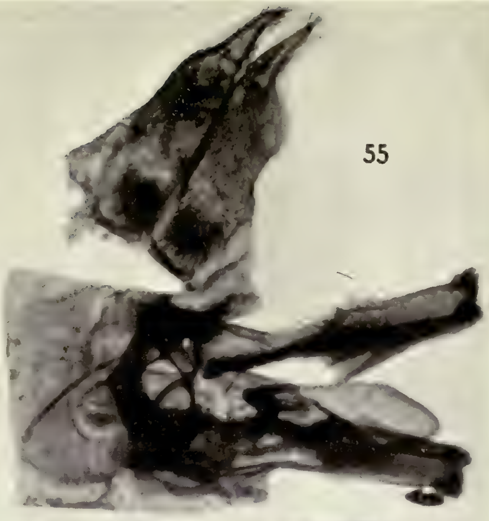

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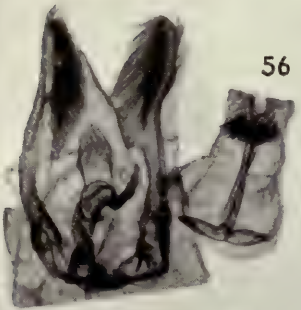

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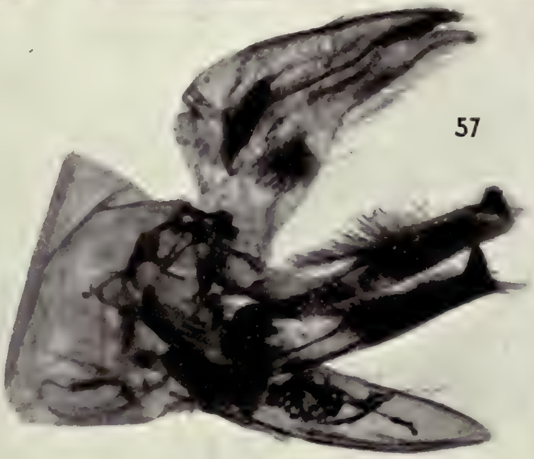

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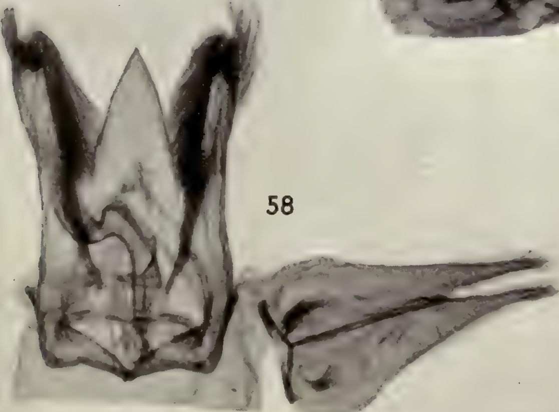

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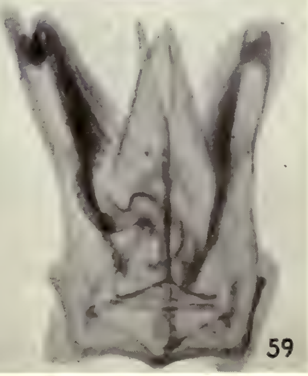

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PLATE 20

FIG. 60. *Procapperia pelecyntes* (Meyrick). Male copulatory apparatus. Praep. no. 1947/58. (Ceylon.)

FIG. 61. *Procapperia linariae* (Chrétien). Male copulatory apparatus. Praep. no. 1947/12. Holotype. (Morocco.)

FIG. 62. *Stangeia siceliota* (Zeller). Male copulatory apparatus. Praep. no. 1947/68. (Corsica: *ex* Zeller coll.)

FIG. 63. *Trichoptilus pygmaeus* Walsingham. Male copulatory apparatus. Praep. no. 1947/67. Paratype. (Millville, Shasta Co., California, 10.viii.1871, Wlsm.)

FIG. 64. '*Oxyptilus heterodactylus* Vill.' from Meyrick's collection (vide *Crombrugghia distans* (Zeller)). Male copulatory apparatus. Praep. no. 1947/55. (Saas, Switzerland, 7,000 ft., 18.8.00.)

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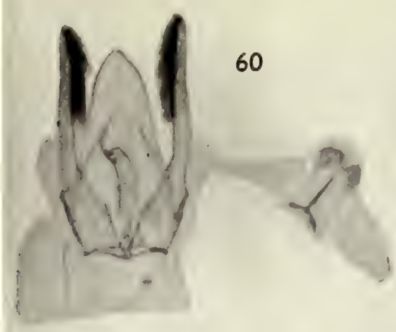
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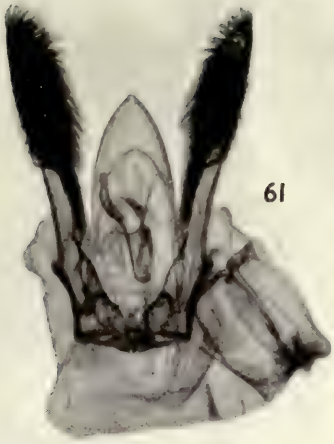
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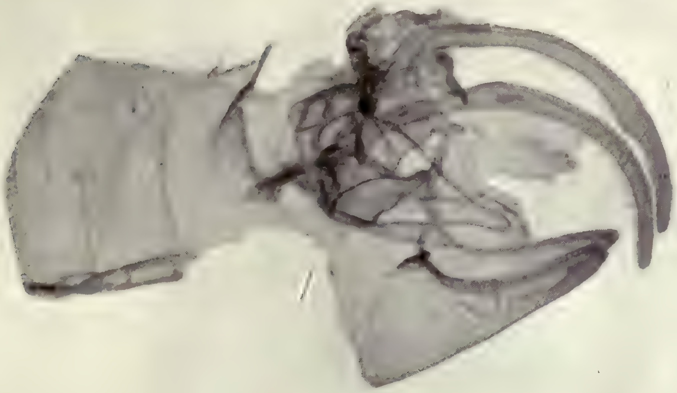
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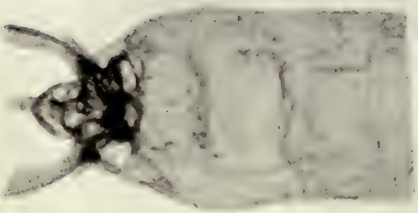
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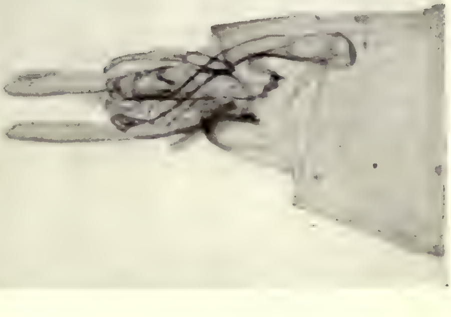
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ENTOMOLOGY Vol. 1 No. 6
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PAR

JACQUES DE BEAUMONT xuf.

(*Musée Zoologique de Lausanne*)

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SPHECIDAE (HYMENOPTERA) RÉCOLTÉS EN ALGÉRIE ET AU MAROC PAR M. KENNETH M. GUICHARD

Par JACQUES DE BEAUMONT

(MUSÉE ZOOLOGIQUE DE LAUSANNE)

GRÂCE à la complaisance de Monsieur R. B. Benson, du British Museum (Natural History), il m'a été possible d'étudier un très intéressant matériel de SPHECIDAE de l'Afrique du nord. Il s'agit d'insectes qui ont été récoltés en 1943–4 par Monsieur K. M. Guichard alors qu'il était attaché comme « Locust Officer » à la « British Economic Mission of the North African Economic Board ». M. Guichard eut l'occasion de parcourir une grande partie de l'Algérie et de visiter rapidement le Maroc pour ses études acridologiques; il en profita pour récolter d'autres insectes, et en particulier des Hyménoptères; l'on peut le féliciter d'avoir, dans ces conditions, réuni un matériel aussi intéressant.

La collection que j'ai reçue à l'étude comprenait en effet 156 espèces de Sphécides, parmi lesquelles 15 au moins sont nouvelles pour la science; certaines de celles-ci m'étaient, il est vrai, déjà connues par mes propres récoltes en Algérie et au Maroc ou par des envois de divers musées. Outre ces espèces nouvelles, le matériel de M. Guichard me permet de décrire quelques sous-espèces et d'apporter d'utiles compléments à la connaissance de certaines formes.

Si ces insectes sont intéressants du point de vue systématique, ils le sont aussi pour les renseignements qu'ils peuvent nous donner sur la faunistique et la zoogéographie de l'Afrique du nord. M. Guichard a en effet récolté soit dans la partie méditerranéenne de l'Algérie et du Maroc, soit, dans l'Algérie méridionale, à la limite de la région saharienne et l'on verra les enseignements que l'on peut tirer de l'étude de ce matériel.

Je donne ci-dessous la liste des localités d'où proviennent les insectes avec, pour certaines d'entre elles, les indications qu'a bien voulu me communiquer M. Guichard.

a. Algérie méditerranéenne

Maison Carrée. i–vii.43, vi.44. A quelques kilomètres à l'est d'Alger.

« Most of the collecting was done on cultivated ground of light soil and the environs of the Ecole Agricole were collected over fairly thoroughly (but not in July and August) and not much attention was paid to the coastal sandhills during June. »

Tagramaret. 19–25.v.43. A 70 kilomètres environ au S-E. d'Oran.

« This locality refers to the Oued el Abd gregarization area of the Moroccan Locust, 20 km. from Tagramaret and 14 km. from the main road. There was only light cereal cultivation in patches, and collecting was done in an otherwise stony area, along the sandy and rocky oued bed and along the lines of the more sandy depressions. The aculeate fauna congregated to the Umbellifers and Euphorbia and this applies to all the localities where I collected in Algeria. »

Autres localités (par ordre alphabétique):

L'Arba. iv.43. A une douzaine de km. au sud d'Alger.
Forêt de Bainem. vi.44. Aux environs d'Alger.
Bernelle. 10.iv.44. Au S. de Constantine et pas loin de Pasteur, près Batna.
Berroughia. 30.iv. et vi.44. A 80 km. au sud d'Alger.
Bou Hanifia. 2.vi.43. A environ 160 km. au sud d'Oran, non loin d'Arzew.
Collo. 14.vi.44. Sur la côte, à 35 km. à l'ouest d'Alger.
Frenda. 20.v.44. Près de Tagramaret.
Medea. 26.vi.44. A environ 40 km. au sud d'Alger.
Michelet. 16.vi.44. A 120 km. au S-E. d'Alger, au nord des monts de La Kredidja.
Notre Dame du Mont. 7.ii.43. Dans les montagnes au sud de Rivet, près d'Alger.
Orleansville. 2.v.44.
Saïda. v.43. Au S-E. d'Oran.
Schrea. 26.vi.44. A 40–50 km. d'Alger, à 1500 m. d'altitude.
Sidi Ferruch. vi.44. Sur la côte, à l'est d'Alger.
Tlemcen. 16.v.44.
Zana. 11.iv.44. Près de Bernelle, ruines romaines.

b. Maroc

Aîn Tafentecht. 10.v.44. Sur la route Mogador–Marrakech.
Idni. 8.v.44. Dans le Grand Atlas.
Ifrane. 13.v.44. Dans le Moyen Atlas.
Kasba Tadla. 11.v.44.
Tassiala. 10.v.44. (Les étiquettes portent: Tassida.) Dans la plaine du Sous, sur l'Oued Massa, au nord de Tiznit.
Tizi n'Test. v.44. Dans le Grand Atlas.
Route Tiznit–Agadir. v.44.

c. Sud algérien et Sahara

Aflou. 8.vi.43. Dans le Djebel Amour.

« No collecting on cultivated ground, but at Euphorbias on barren ground and along a stream with a few sandhills nearby. Aflou is on a plain in the southern part of the Algerian high plateau north of the Saharan Atlas range. I think it marks the limit of appreciable cereal cultivations. »

Taouiala. 5.vi.43. (Les étiquettes portent: Talouiala.) A 50 km. au S-E. d'Aflou.

« This is a beautiful oasis of about 1500 inhabitants that lies in a large depression in the mountains. It is similar to the oases of the Saharan Atlas range. Collecting was done on Euphorbias along the bed of an oued. Although there is a light cereal cultivation outside the oasis, the surrounding area is barren. »

Laghouat. v et 17.vi.43.

« Collected amongst sand dunes with tamarisk trees, but my recollections are faint, as I was too busy killing locusts. Laghouat, I think, may have a similar fauna to Biskra. »

Tadjerouna. v.43.

« An Oasis south of the Saharan Atlas and unmistakably desertic. At the time of my visit every green plant in the oasis had been eaten by locust hoppers. Collecting was at Euphorbia on barren sandy ground on the outskirts of the oasis. »

Tadjemout. 20.vi.43 et *Aïn Madhi.* 10.vi.43.

« Desertic oases. At one of these localities I collected in a cultivated vegetable garden with light soil and plenty of Umbellifer flowers, on the outskirts of the oasis. »

Autres localités:
Beni Ounif. 7.iii.44.
Colomb Béchar. 4.iii.44.
El Ahmar. 3.iii.44. Près de Colomb Béchar.
Tindouf. 16.vii.43. Sahara occidental; sur l'aérodrome.

Il n'y a pas grand'chose à dire, au point de vue zoogéographique, des insectes récoltés dans l'Algérie du nord et au Maroc et qui appartiennent tous à la faune méditerranéenne. Un intérêt particulier, par contre, s'attache aux 6 localités de l'Algérie méridionale sur lesquelles M. Guichard a donné les renseignements que j'ai reproduits; elles sont en effet situées près de la limite des régions méditerranéenne (domaine steppique) et saharienne, telle qu'elle a été établie par les travaux des botanistes.

Je reproduis ici (fig. 1) un fragment de la carte phytogéographique de l'Algérie et de la Tunisie de R. Maire, sur laquelle j'ai repéré les points de récolte de M. Guichard. D'après les indications qu'a bien voulu me communiquer Monsieur Maire, la zone de Laghouat est une de celles où les régions saharienne et méditerranéenne steppique s'intriquent le plus, ce que montre la carte. C'est sans doute dans un but de simplification que la ligne de démarcation des deux régions phytogéographiques ne suit pas toutes les sinuosités des limites entre les associations végétales et l'on peut admettre que les localités de Laghouat, Tadjemout et Aïn Madhi, tout comme celle de Tadjerouna, sont comprises dans la région saharienne. Aflou et Taouiala, par contre, sont situées nettement dans le domaine steppique de la région méditerranéenne. Il est alors intéressant de comparer les Sphécides capturés dans ces deux groupes de localités.

Des 27 espèces provenant d'Aflou et de Taouiala, aucune ne me semble appartenir à la faune saharienne typique. Plusieurs sont largement répandues dans la région paléarctique, d'autres dans la partie méditerranéenne de l'Afrique du nord. Certaines d'entre elles se rencontrent dans les deux régions sans que je puisse dire pour l'instant si elles sont plutôt sahariennes ou méditerranéennes.

Parmi les 84 espèces provenant de Laghouat, Tadjemout, Aïn Madhi et Tadjerouna, 24 sont sahariennes au sens strict, c'est à dire qu'elles n'ont pas encore été trouvées en dehors de cette région; 7 peuvent être considérées comme sahariennes au sens large, c'est à dire que, d'origine saharienne, elles pénètrent cependant plus ou moins loin dans la région méditerranéenne; 6 espèces nouvelles sont peut-être sahariennes; 29 espèces sont nettement méditerranéennes; quant aux 18 autres, leur répartition est encore mal connue et leur appartenance à l'une ou à l'autre faune ne peut être précisée.

Il est évident que l'on ne peut pas établir de conclusions définitives sur des récoltes faites occasionnellement et pendant quelques jours seulement. Il me semble cependant que ces récoltes peuvent nous donner un aperçu de la faune et l'on peut constater combien le spectre de celle-ci change lorsque nous passons d'une région à l'autre. Nous voyons en tous cas combien les zoogéographes ont intérêt à s'appuyer sur les données fournies par les phytogéographes.

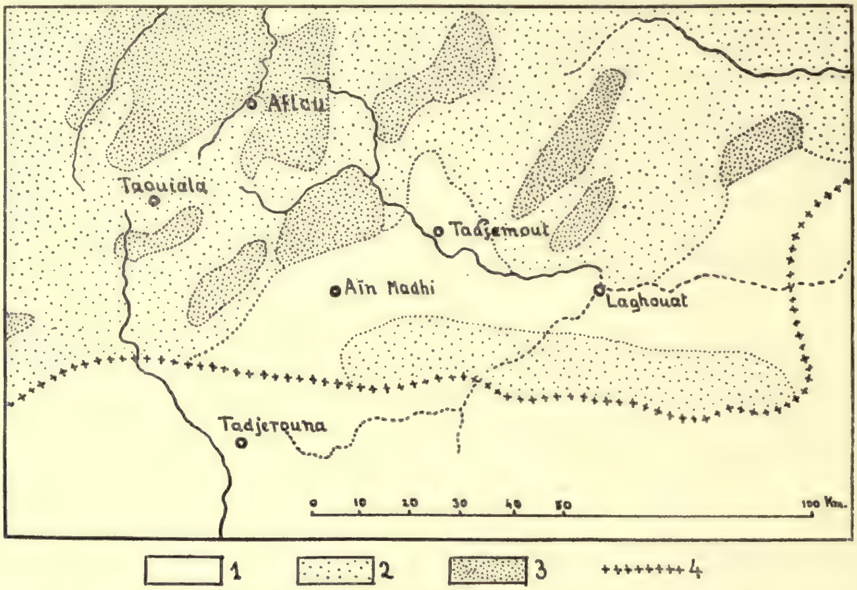


FIG. 1. Carte phytogéographique de la région de Laghouat et du Djebel Amour. (D'après R. Maire.) 1: Steppes sahariennes et désert. 2: Steppes. 3: Formation de *Juniperus Phoenicea*. 4: Limite entre la région méditerranéenne (domaine mauritanien steppique) et la-région saharienne.

Il semble donc que la faune du Djebel Amour soit principalement méditerranéenne, et ceci même dans les biotopes plutôt désertiques où M. Guichard a récolté. Par contre, la faune de la région Laghouat-Tadjerouna est déjà nettement saharienne et je pense que les éléments méditerranéens qu'elle renferme doivent se trouver surtout dans la partie cultivée des oasis. Cette faune ressemble beaucoup à celle de Biskra et à celle du Maroc saharien, entre Ksar es Souk et Ouarzazate, où j'ai eu l'occasion de récolter en 1947. De nombreuses espèces, d'ailleurs, se rencontrent dans toute l'Afrique du nord, de l'Égypte au Sahara espagnol (assez bien connu maintenant par les recherches de Giner Mari), et les quelques données que nous possédons montrent que cette faune doit se retrouver assez semblable jusque dans le Sahara central.

J'aurai l'occasion, dans d'autres travaux, de revenir sur les divers problèmes zoogéographiques et écologiques que pose l'étude de la faune saharienne.

Dans la liste des espèces, j'ai indiqué les localités dans l'ordre où elles ont été signalées ci-dessus ; les dates de capture n'ont été notées que lorsque les endroits ont été visités à diverses reprises.

Les espèces des genres *Philanthus*, *Philoponidea*, *Cerceris*, et *Palarus* seront étudiées dans des travaux relatifs à ces genres et dont certains paraîtront avant celui-ci. Mes connaissances actuelles ne m'ont pas permis de déterminer avec certitude certaines espèces, en particulier dans le groupe des Pemphredoniens.

Les types (à l'exception de ceux de 2 sous-espèces d'*Oxybelus*) seront déposés au British Museum ; pour certaines espèces, des paratypes se trouveront dans ma collection.

Ammophila Kirby

Ammophila (*Podalonia*) *hirsuta* Scopoli. *a*: Bernelle, 1 ♀; Schrea, 4 ♂, 6 ♀; Zana, 2 ♀. *b*: Aïn Tafentecht, 1 ♂, 1 ♀; Tizi n'Test, 1 ♂.

Ammophila (*Podalonia*) *tydei* Le Guillou. *a*: Maison Carrée, 13.i–15.ii.43, 3 ♀; Sidi Ferruch, 1♂. *b*: Tassila, 3 ♂, 7 ♀.

Ammophila (*Podalonia*) *mauritanica* Mercet. *c*: Aflou, 1 ♀; Laghouat, 17.vi, 1 ♂; Tadjemout, 3 ♂; Colomb Béchar, 1 ♀.

Ammophila (*Podalonia*) *affinis* Kirby. *a*: Tagramaret, 1 ♀; Berroughia, 30.iv, 1 ♂, 1 ♀.

Ammophila (*Podalonia*) *minax* Kohl. *c*: Beni Ounif, 1 ♂.

Kohl n'a connu que la femelle. Le mâle a été décrit d'Egypte par Alfieri (1946) et du Rio de Oro par Giner Mari (1945). Il me semble à peu près certain que *A. confalonierii* Guiglia (1932) est synonyme de cette espèce.

Ammophila (*Parapsammophila*) *lateritia* Taschenberg (= *monilicornis* Morice). *c*: Tadjemout, 1 ♂.

Cette synonymie a été supposée par Roth (1928) et admise par Alfieri (1946). Je puis la confirmer, ayant capturé à Biskra (vi. 1948) des mâles de *monilicornis* poursuivant des femelles correspondant à la description de *lateritia*.

Ammophila (*Eremochares*) *dives melanopus* Lucas (= *festiva* Smith, *doriae* Gribodo). *c*: Tadjemout, 5 ♂, 3 ♀.

Schulz (1905) a déjà fait remarquer que les *A. dives* Brullé d'Afrique du nord diffèrent de la forme typique, décrite de Grèce, par la coloration rouge plus développée sur l'abdomen ; il leur donne le nom de *dives* ssp. *doriae* Gribodo. Mais il existe deux noms antérieurs pour désigner cette race : *festiva* Smith et *melanopus* Lucas, dont le type a été vérifié par Kohl.

Ammophila (*Eremochares*) *algira* Kohl. *c*: Taouiala, 4 ♀.

Chez deux individus, la 2e nervure récurrente est interstitielle, chez les deux autres elle aboutit dans la 3e cellule cubitale (nervulation de *Sphex*).

Ammophila (*Coloptera*) *barbara* Lepeletier. *a*: Tagramaret, 1 ♂, 4 ♀.

Ammophila (*Ammophila*) *haimatosoma* Kohl. *c*: Laghouat, v et vi, 4♂, 1 ♀.

Le développement de la pilosité et l'étendue de la coloration rouge varient beaucoup chez cette espèce. La femelle de la collection Guichard a la tête et le thorax presque entièrement d'un ferrugineux très foncé.

Ammophila (*Ammophila*) *fallax* Kohl. *b*: Ifrane, 1 ♂.

Ammophila (*Ammophila*) *gracillima* Taschenberg. *c*: Tadjemout, 1 ♂.

Ammophila (*Ammophila*) *heydeni* Dahlbom. *a*: Tagramaret, 4 ♀; Michelet, 1 ♂, 1 ♀; Tlemcen, 3 ♀. *b*: Route Tiznit–Agadir, 1 ♀.

Ammophila (*Ammophila*) *propinqua* Taschenberg. *c*: Taouiala, 1 ♀; Tadjemout, 2 ♀; Tadjerouna, 1 ♀; Aïn Madhi, 1 ♀.

Ammophila (*Ammophila*) *sabulosa touareg* André. *b*: Idni, 1 ♂.

Sphex Linné

Sphex (*Palmodes*) *occitanicus* Lepeletier et Serville. *a*: Tagramaret, 2 ♂.

Roth (1925) a signalé la variation de cette espèce en Afrique du nord. Les deux mâles de la collection Guichard se distinguent d'exemplaires de la France méridionale par les ailes un peu plus enfumées, les deux premiers tergites presque entièrement rouges, la striation transversale de la face dorsale du propodéum plus fine.

Sphex (*Calosphex*) *niveatus* Dufour. *c*: Laghouat, v, 1 ♀; Tindouf, 3 ♂.

Sphex (*Prionyx*) *viduatus* Christ. *b*: Tassiala, 1 ♂.

Sphex (*Prionyx*) *albisectus* Lepeletier et Serville. *a*: Maison Carrée, 12.v.43, 1 ♂; Sidi Ferruch, 1 ♂.

Sphex (*Sphex*) *pruinosus* Germar. *c*: Laghouat, 17.vi, 1 ♂.

Sphex (*Sphex*) *maxillosus* Fabricius. *a*: Maison Carrée, 12.v.43, 1 ♂; Medea, 1 ♀.

Sphex (*Sphex*) *flavipennis* Fabricius. *c*: Tadjerouna, 1 ♀.

Sceliphron Klug

Sceliphron (*Sceliphron*) *spirifex* Linné. *b*: Marrakech, 3 ♀; Tassiala, 1 ♂, 1 ♀. *c*: Laghouat, vi, 1 ♂.

Sceliphron (*Sceliphron*) *destillatorium* Illiger. *c*: Aflou, 1 ♂.

Philanthus Fabricius

Les indications relatives aux espèces de ce genre et du suivant seront données dans un travail qui doit paraître en 1949 dans les *Mitt. schweiz. ent. Ges.*

Philanthus triangulum abdelkader Lepeletier. *a*: Maison Carrée, 12.v.43, 1 ♀. *b*: Tassiala, 1 ♀; Route Tiznit–Agadir, 1 ♂. *c*: Laghouat, 17.vi, 12 ♂, 2 ♀.

Philanthus variegatus ecoronatus Dufour. *c*: Taouiala, 2 ♂.

Philanthus ammochrysus Schulz. *c*: Laghouat, 17.vi, 1 ♂; Tadjerouna, 1 ♀.

Philanthus raptor Lepeletier. *a*: Maison Carrée, 16.vi.44, 1 ♂. *c*: Aflou, 2 ♂; Taouiala, 1 ♀; Laghouat, v–vi, 1 ♂, 5 ♀; Tadjemout, 7 ♂.

Philanthus (*Philanthinus*) *integer* Beaumont. *c*: Laghouat, vi, 1 ♂, 1 ♀; Tadjemout, 1 ♂; Tadjerouna, 3 ♂, 6 ♀.

Philoponidea Pate

Philoponidea dewitzi Kohl. *c*: Laghouat, vi, 1 ♀.

Philoponidea berlandi Beaumont. *c*: Tadjerouna, 1 ♀.

Cerceris Latreille

Les indications relatives aux espèces de ce genre paraîtront dans un autre travail.

Cerceris rybyensis Linné. *a*: Tagramaret, 1 ♀. *c*: Aflou, 1 ♀; Taouiala, 1 ♂, 2 ♀.

Cerceris emarginata Panzer. *a*: Tagramaret, 1 ♂; Forêt de Bainem, 1 ♂. *b*: Kasba Tadla, 1 ♂; Tassiala, 1 ♂. *c*: Taouiala, 1 ♂, 1 ♀; Laghouat, vi, 1 ♀; Tadjemout, 3 ♀; Aïn Madhi, 1 ♀.

Cerceris alfierii Mochi. *c*: Laghouat, vi, 1 ♀; Tadjemout, 2 ♂.

Cerceris priesneri Mochi. *c*: Tadjerouna, 1 ♂, 1 ♀.

Cerceris fischeri Spinola. *c*: Tadjemout, 1 ♀.

Cerceris pruinosa Morice. *c*: Laghouat, vi, 1 ♂; Tadjerouna, 1 ♂.

Cerceris eatoni Morice. *c*: Laghouat, v–vi, 4 ♂, 3 ♀; Tadjemout, 1 ♂, 2 ♀; Tadjerouna, 2 ♂.

Cerceris pulchella (Spinola) Mochi. *c*: Laghouat, vi, 1 ♀.

Cerceris annexa Kohl. *c*: Laghouat, v–vi, 4 ♂, 3 ♀; Tadjemout, 1 ♂, 2 ♀; Tadjerouna, 3 ♂.

Cerceris bupresticida Dufour. *c*: Laghouat, v–vi, 2 ♂, 2 ♀.

Cerceris tricolorata (Spinola) Mochi. *c*: Laghouat, v, 1 ♂; Tadjemout, 3 ♂, 1 ♀.

Cerceris chromatica Schletterer (= *lateriproducta* Mochi). *c*: Laghouat, vi, 1 ♂.

Cerceris atlantica Schletterer. *a*: Tagramaret, 1 ♂. *c*: Tadjemout, 1 ♂.

Cerceris sp.? *a*: Maison Carrée, 19.vi.44, 1 ♂; Sidi Ferruch, 1 ♂. *c*: Aflou, 1 ♂. Appartiennent au groupe d'*arenaria*.

Cerceris rufiventris Lepeletier. *a*: Tlemcen, 2 ♂.

Cerceris guichardi Beaumont. *c*: Taouiala, 2 ♂, 4 ♀.

Cerceris quadricincta Panzer. *a*: Maison Carrée, 12.v.43, 1 ♂; Berroughia, vi, 1 ♂; Michelet, 1 ♀. *b*: Tassiala, 1 ♂. *c*: Aflou, 2 ♂, 2 ♀; Taouiala, 2 ♂; Laghouat, vi, 2 ♂; Tadjemout, 1 ♀; Aïn Madhi, 1 ♂, 2 ♀.

Cerceris ferreri Van der Linden. *a*: Medea, 1 ♂, 1 ♀.

Cerceris escalerai Giner. *b*: Tassiala, 1 ♂. *c*: Laghouat, v, 1 ♀.

Cerceris schmiedeknechti Kohl. *a*: Tagramaret, 1 ♂. *b*: Kasba Tadla, 2 ♂.

Cerceris eurypyga Kohl. *c*: Laghouat, v, 1 ♂; Tadjemout, 1 ♀.

Cerceris teterrima Gribodo (= *hartliebi* Schulz). *c*: Tadjerouna, 1 ♀.

Cerceris straminea Dufour. *c*: Laghouat, vi, 2 ♂; Tadjerouna, 3 ♂; Tindouf, 1 ♀

Cerceris solitaria Dahlbom (= *erythrocephala* Dahlbom). *c*: Tadjerouna, 1 ♂.

Bembix Latreille

Bembix galactina Dufour. *c*: Laghouat, v–vi, 2 ♀; Tadjemout, 1 ♀; Aïn Madhi, 3 ♂, 1 ♀

Bembix sinuata Latreille. *c*: Tadjemout, 1 ♀.

Bembix oculata Latreille. *a*: Maison Carrée, 19.vi, 1 ♂, 1 ♀. *c*: Tadjemout, 3 ♂, 1 ♀.

Bembix bolivari Handlirsch. *a*: Maison Carrée, 19.vi, 1 ♀.

Bembix olivacea Fabricius (= *mediterranea* Handlirsch). *a*: Maison Carrée, 19.vi, 4 ♂.

Bembix olivacea saharae Giner. *c*: Laghouat, v–vi, 5 ♂, 3 ♀; Tadjemout, 2 ♀.

Stizus Latreille

Stizus (*Bembecinus*) *tridens errans* ssp. n. *a*: Maison Carrée, 12.v, 1 ♂, 1 ♀. *c*: Taouiala, 1 ♂; Laghouat, v–vi, 3 ♂, 2 ♀; Aïn Madhi, 1 ♂.

Ferton (1911) a donné des renseignements sur les mœurs d'un *Stizus* qu'il a étudié à La Calle, et qu'il nomme *errans* Kohl; Nadig (1933) cite cette espèce du Maroc. Cette forme n'a jamais été décrite par Kohl; il existe cependant au Musée de Vienne 1 femelle de La Calle, 1.vii.10 (Ferton), désignée comme type de *errans* et 1 mâle, de la même localité, du 20.viii.11. Ces individus, que j'ai pu examiner, appartiennent à la race nord-africaine de *tridens* Fabricius, qui se distingue de la forme typique, d'Europe, par l'échancrure peu accusée à l'extrémité inférieure des arêtes latérales du propodéum (fig. 11) et, comme l'avait déjà noté Morice (1911), par le clypéus de la femelle très fréquemment en partie ou même entièrement jaune. Il me semble logique de valider le nom de *errans* pour distinguer cette sous-espèce de *tridens*, qui est fréquente au Maroc et en Algérie. Il serait intéressant de savoir si les différences dans la biologie entre *tridens* et sa ssp. *errans*, signalées par Ferton, sont constantes.

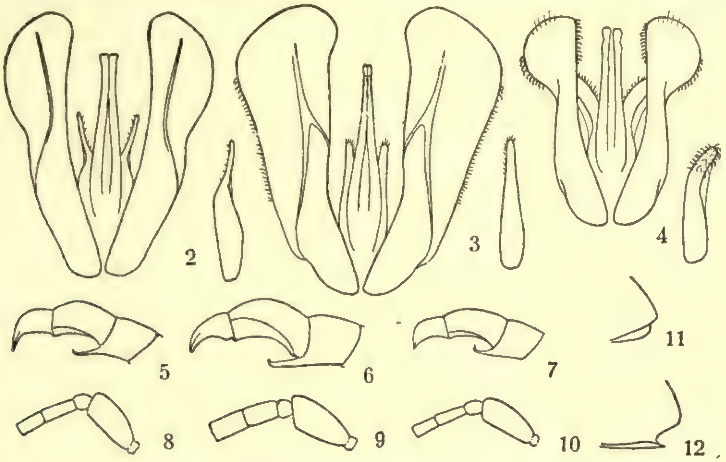
Je considère comme type la femelle désignée comme telle par Kohl (Mus. Vienne).

Stizus (*Bembecinus*) *barbarus* sp. n. *c*: Laghouat, vi, 3 ♀ (dont le type), 3 ♂; Tadjemout, 1 ♂. J'ai examiné également 2 ♂ de Biskra (coll. Naef, ma coll.), 31.v.48 et 1 ♀ du Fezzan: Brak, 27–30.v.43 (F. Bernard).

Cette espèce est voisine de *tridens* Fabricius, répandu dans la région méditerranéenne et en Europe, et de *tenellus* Klug, connu jusqu'à présent d'Egypte seulement. Comme l'a montré Mochi (1939), *tenellus* se distingue principalement de *tridens* par les proportions des diverses parties de la tête, la forme des derniers articles des antennes du mâle, l'armature génitale; les différences dans la nervulation et la coloration ne sont pas constantes, quoique *tenellus* ait généralement la 3^e^ cellule cubitale pétiolée et des dessins jaunes plus développés que chez *tridens*. Dans la description qui suit, je comparerai la nouvelle espèce aux deux autres et j'indiquerai entre celles-ci quelques caractères distinctifs qui n'ont pas été notés par Mochi.

♀. 8–9 mm. Les dessins, d'un jaune clair, plus ou moins verdâtre sur l'abdomen, sont plus développés que chez *tridens*. Ils comprennent: le labre, le clypéus, l'écusson frontal, des bandes au bord interne des yeux, le collare et les tubercules huméraux, une bande sur les côtés du mésonotum, n'atteignant pas tout à fait son bord antérieur, une tache sur la partie antérieure des mésopleures, le scutellum, sauf sa partie antérieure, le postscutellum, de grandes taches latérales sur le propodéum, des bandes, ayant la forme habituelle aux espèces de ce groupe, sur les tergites 1–5, des taches latérales, étroitement réunies au bord postérieur, sur les sternites 2–5. Scapes jaunes, avec une tache dorsale noire plus ou moins développée; funicule ferrugineux clair, obscurci en dessus; ailes hyalines; nervulation brun clair, sauf la plus grande partie de la costale et la partie basale de la subcostale, qui sont presque noires. Pattes jaunes, les fémurs avec une bande noire sur leur face supérieure.

Les proportions des différentes parties de la tête sont semblables à celles de *tenellus*, c'est à dire que la distance interoculaire au vertex est un peu plus du double de celle au clypéus et que la distance postocellaire est nettement plus grande que la distance oculo-ocellaire (environ 10 : 7, en comptant depuis le bord des ocelles); la largeur du clypéus à sa base égale environ 1,3 fois sa longueur (chez *tridens*: 1,7); angles antérieurs du clypéus sans touffes de poils. Le 2^e^ article du funicule est moins de 2 fois aussi long que large, à peine plus long que le 3^e^ (chez les 2 autres espèces, le 2^e^ article est un peu plus de 2 fois aussi long que large). Tête, comme chez *tenellus*, très brusquement rétrécie derrière les yeux (chez *tridens*, les tempes sont plus largement arrondies). Mésonotum et scutellum beaucoup plus brillants que chez les 2 autres espèces, avec une ponctuation très fine et très espacée (les espaces beaucoup plus grands que les points), sans points plus gros (chez *tenellus*: ponctuation beaucoup plus dense; chez *tridens*: ponctuation de base microscopique avec des points plus gros isolés). Comme chez *tenellus*, les carènes limitant en bas les faces latérales du propodéum sont droites et se terminent par une dent aiguë (fig. 12); chez *tridens errans* (fig. 11), ces carènes ne se terminent pas par une dent aiguë et le profil des carènes latérales, d'ailleurs un peu variable, est également différent. Les tergites abdominaux montrent une sculpture semblable à celle de *tridens*, avec des points assez espacés sur un fond brillant (chez *tenellus*, la ponctuation est beaucoup plus fine et plus dense); la ponctuation du 6^{e} tergite est nettement plus espacée que chez *tridens*, avec des épines moins nombreuses. Chez tous les exemplaires examinés, la 2^{e} cellule cubitale est nettement ouverte sur la radiale. Comme chez *tenellus*, les poils dressés sont plus courts que chez *tridens*, tandis que la pilosité argentée couchée est plus développée, cachant en grande partie la sculpture du front et des mésopleures.



FIGS. 2–12. *Stizus tridens* Fabricius, *barbarus* sp. n. et *tenellus* Klug. 2. *tridens*, armature génitale vue par dessus et volsella vue par dessous. 3. *barbarus*, id. 4. *tenellus*, id. 5. *tridens* ♂, derniers articles des antennes. 6. *barbarus*, id. 7. *tenellus*, id. 8. *tridens* ♂, premiers articles des antennes. 9. *barbarus*, id. 10. *tenellus*, id. 11. *tridens errans*, côté du propodéum. 12. *barbarus*, id.

♂. 6–8 mm. Coloration, pilosité et sculpture comme chez la femelle. Comme chez celle-ci, les yeux convergent un peu plus vers le bas que chez *tridens* et le clypéus est un peu moins large; distances oculo-ocellaire et postocellaire comme chez l'autre sexe. Les scapes sont plus renflés que chez les deux autres espèces et, comme chez la femelle, les premiers articles du funicule sont plus courts (fig. 8 à 10). La forme des derniers articles des antennes fournit aussi de bons caractères distinctifs (fig. 5 à 7); l'appendice de l'anté-pénultième article est plus épais et moins courbé à l'extrémité chez *barbarus* que chez les 2 autres (il est plus long chez *tridens* que chez *tenellus*); chez *barbarus*, le dernier article est plus allongé que chez *tenellus*, sa pointe terminale moins étirée que chez *tridens* et plus nettement excavée en dessous. Dernier tergite moins allongé que chez *tridens*, nettement échancré à l'extrémité. Fémurs postérieurs, comme chez les 2 autres espèces, sans épines à sa face interne, mais avec 3–4 longs poils dressés sur la partie basale de leur arête inférieure.

Les armatures génitales des 3 espèces sont très différentes (fig. 2 à 4). Mochi (*loc. cit.*) a figuré celles de *tridens* et de *tenellus*, mais il faut noter de petites inexactitudes dans ces dessins. Les appendices que l'on voit faire saillie des deux côtés du pénis n'ont pas exactement la forme représentée; ce sont de longues baguettes qui, en position de repos, sont appliquées sous les crochets du pénis et ne sont, de ce fait, pas toujours visibles; je ne les ai pas dessinées. L'examen de l'armature par sa face dorsale révèle de grandes différences dans la forme et la pilosité des valves externes; l'étude par la face ventrale permet de voir aussi de notables caractères distinctifs dans la forme et la pilosité des volselles.

Stizus (*Bembecinus*) *acanthomerus* Morice. *c*: Tadjemout, 3 ♂, 2 ♀.

C'est une femelle de cette espèce que Schulz (1905) a considérée comme étant *cyanescens* Radoszkowski; l'exemplaire, que j'ai examiné, se trouve au Muséum de Strasbourg.

Stizus (*Bembecinus*) *gazagnairei* Handlirsch. *a*: Tagramaret, 3 ♀; Frenda, 3 ♂.

La détermination des femelles n'est pas certaine.

Stizus (*Bembecinus*) *discolor* Handlirsch. *c*: Laghouat, 17.vi, 1 ♂; Tadjemout, 8♂, 6 ♀.

Stizus (*Stizus*) *grandis* Lepeletier. *a*: Tagramaret, 3 ♂. *c*: Tadjemout, 4 ♀.

Sphecius Dahlbom

Sphecius intermedius Handlirsch. *c*: Aflou, 1 ♀.

Sphecius schulthessi Roth. *c*: Aflou, 5 ♀; Taouiala, 7 ♂, 7 ♀; Laghouat, 2 ♀.

Cette espèce sera prochainement décrite.

Sphecius claripennis Morice. *c*: Tadjemout, 1 ♂, 3 ♀.

Sphecius hemixanthopterus Morice. *c*: Laghouat, v, 1 ♂; Tadjemout, 1 ♀.

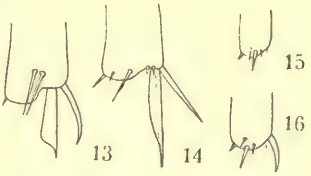
Gorytes Latreille

Gorytes (*Ammatomus*) *rhopalocerus* Handlirsch. *b*: Marrakech, 1 ♀. *c*: Tadjemout, 1 ♂.

Gorytes (*Harpactes*) *mundus* sp. n. *a*: Maison Carrée, iv et v.43, 12 ♂, 3 ♀. *c*: Aflou, 4 ♂, 2 ♀ (dont le type). J'ai examiné aussi une ♀ d'Ijoukak (Grand Atlas), 9.v.47 (ma coll.).

Espèce voisine d'*elegans* Lepeletier et s'en distinguant principalement par l'armature des pattes.

♀. 7–8 mm. Sont d'un jaune doré sur la tête: les mandibules, sauf leur pointe, le labre, le clypéus, la face inférieure des scapes, l'écusson frontal et de larges bandes au bord interne des yeux; face inférieure du funicule jaune à la base, devenant ferrugineuse à l'extrémité. Sont d'un jaune blanchâtre sur le thorax: une strie, parfois interrompue, au collare, les tubercules huméraux, une tache sur les tegulae, une petite tache à la partie antérieure des mésopleures et une tache, plus ou moins grande, sur le scutellum. Les 2 ou les 3 premiers segments abdominaux rouges; le 1er tergite peut porter 2 petites taches blanchâtres arrondies; tergite 2 avec 2 taches latérales blanches, s'allongeant en pointe le long du bord postérieur, mais largement séparées l'une de l'autre; tergites 3 et 4 avec une bande terminale élargie sur les côtés, interrompue au milieu sur le 3e, parfois aussi sur le 4e; tergite 5 avec une tache médiane au bord postérieur, parfois accompagnée de taches latérales. Hanches 1 et 2 souvent tachées de blanc jaunâtre à l'extrémité; fémurs 1 et 2 noirs, avec la face inférieure d'un blanc jaunâtre, cette tache claire plus ou moins bordée de ferrugineux; fémurs 3 noirs, plus ou moins teintés de ferrugineux le long de leur face supérieure et en dessous à l'apex; tibias et tarses d'un ferrugineux clair, les tibias 1 et 2 avec une tache distale noire sur leur face postérieure. La femelle d'origine marocaine se distingue des autres par l'absence de tache claire aux mésopleures et au scutellum, par ses fémurs 3 entièrement noirs, ses tibias 3 obscurcis à la base et à l'apex, la base des tarses 3 noirâtre.



FIGS. 13–16. *Gorytes elegans* Lepeletier ♂ et *mundus* sp. n. ♂. 13. *elegans*, extrémité du tibia 3, face externe. 14. *mundus*, id. 15. *elegans*, extrémité du tibia 2, face externe. 16. *mundus*, id.

La tête, vue de face, montre les mêmes proportions et la même structure que celle d'*elegans*, c'est à dire que le bord antérieur du clypéus est légèrement échancré, que les bords internes des yeux divergent légèrement en haut et en bas et que la distance entre l'ocelle antérieur et la base du clypéus est à peu près égale à la largeur minimale de la face. La ponctuation de la tête et du mésonotum est légèrement plus fine que chez *elegans*; sur l'aire dorsale du propodéum, les 2 stries médianes sont nettement sinueuses; les stries latérales, plus ou moins obliques, s'effacent parfois dans la partie postérieure, qui n'est cependant jamais lisse; les aires latérales et la face postérieure du propodéum sont striées, mais moins fortement que chez *elegans*; ponctuation des tergites comme chez cette espèce. Epines des pattes également comme chez *elegans*, mais l'extrémité des tibias postérieurs est différente. Chez *elegans* (voir fig. 13), la face externe s'allonge à l'extrémité en une petite zone brillante, à la base de laquelle se trouvent 2 épines étroitement juxtaposées, plus longues que celles du reste du tibia; chez *mundus*, la zone apicale brillante est très réduite et les 2 épines qui la précèdent sont plus éloignées l'une de l'autre et pas plus longues que celles qui garnissent la face externe des tibias (nota: ces épines sont brisées chez les femelles de la collection Guichard). Pilosité très courte et peu développée, roussâtre sur la tête et sur le dos du thorax, blanche ailleurs.

♂. 6–7,5 mm. Coloration de la tête comme chez la femelle; sur le thorax, les individus les plus foncés n'ont de taches blanches qu'aux tegulae et aux tubercules huméraux; les plus clairs sont tachés comme les femelles; bandes des 3e et 4e tergites en général largement interrompues; 5e tergite noir ou avec une bande interrompue; fémurs 3 souvent jaunâtres à la base de la face externe; tibias 3 rembrunis à la base et, plus largement, à l'apex; tarses 3 plus ou moins rembrunis.

Sculpture comme chez la femelle. Articles du funicule un peu plus longs que chez *elegans*, les derniers semblablement conformés; scapes un peu moins renflés. Les différences les plus marquées, entre la nouvelle espèce et *elegans* s'observent, comme pour les femelles, sur les tibias. Les tibias postérieurs d'*elegans* ♂ montrent, à l'extrémité de leur face externe, la même structure que la femelle (fig. 13); de plus, l'éperon externe est nettement courbé et l'éperon interne fortement dilaté, en forme de gouttière; chez *mundus* (fig. 14), les 2 grandes épines antéapicales n'existent pas et les éperons sont normaux. A l'extrémité des tibias 2, *elegans* est dépourvu d'éperons (fig. 15) et *mundus* en montre un seul (fig. 16). Le fait est assez singulier si l'on sait que l'armature des tibias 2 sert à caractériser les sous-familles de Sphecidae et que les Nyssoninae portent typiquement 2 éperons. Ayant examiné les espèces voisines, j'ai constaté que *consanguineus* Handlirsch et *exiguus* Handlirsch ont 2 éperons, mais qu'*affinis* Spinola ♂ n'en a qu'un à l'extrémité des tibias 2; chez cette dernière espèce, les tarses 1 et 2 ont des articles très courts.

Il me semble que les caractères signalés suffisent pour considérer *mundus* comme espèce distincte, qui remplacerait peut-être *elegans* dans l'Afrique du nord; il faut cependant noter que cette dernière espèce a été citée d'Algérie par Berland (1925) et par von Schulthess (1926). Je signale encore que les exemplaires d'*elegans* qui m'ont servi pour la comparaison proviennent de Suisse, de la France méridionale, de Corse et d'Italie.

Gorytes (*Harpactes*) *ifranensis* Nadig. *c*: Laghouat, v, 1 ♂.

Espèce décrite d'apres une seule femelle, d'Ifrane, et que j'ai retrouvée à Marrakech. Le mâle, qui sera décrit plus en détails dans un autre travail, a le premier et une partie du 2^e^ segments rouges, des taches jaunes assez grandes sur le 2^e^ tergite et parfois 2 plus petites sur le 1^er^ tergite; le reste de l'abdomen est noir.

Gorytes (*Harpactes*) *formosus* Jurine. *a*: Tagramaret, 2 ♂.

J'ai montré (1945) que, parmi les « *Gorytes laevis* » de l'Europe centrale, existent deux formes, *laevis* Latreille et *formosus* Jurine, qui sont probablement deux espèces distinctes. Les deux mâles de la collection Guichard se rattachent nettement, par la présence de 2 grandes taches claires au 1^er^ tergite et par leur sculpture relativement forte, à *formosus*. Ils sont de coloration relativement foncée: tête tachée de blanc seulement le long du bord interne des yeux. Sont rouges chez l'un des spécimens: le collare et les tubercules huméraux, le mésonotum, le scutellum, la partie postérieure du postscutellum, d'assez grandes taches sur les mésopleures, les métapleures et les côtés du propodéum; chez l'autre exemplaire, le collare et le propodéum sont noirs. Pattes noires; face antérieure des tibias 1 et une partie de celle des tibias 2 ferrugineuses.

Gorytes (*Hoplisoides*) *quedenfeldti* Handlirsch. *a*: Tagramaret, 3 ♀.
Gorytes (*Hoplisus*) *pleuripunctatus* Costa. *a*: Tagramaret, 1 ♂. *c*: Laghouat, vi, 1 ♂.

Nysson Latreille

Nysson (*Synneurus*) *handlirschi* Handlirsch. *c*: Aflou, 1 ♂, 2 ♀; Taouiala, 4 ♂; Laghouat, 17.vi, 1 ♂, 2 ♀; Tadjemout, 1 ♂, 3 ♀; Aïn Madhi, 1 ♂.

Nysson (*Brachystegus*) *braueri* Handlirsch. *c*: Tadjemout, 1 ♂.
Nysson (*Nysson*) *varelai* Mercet. *a*: Tagramaret, 1 ♀.

Cette espèce, décrite d'Espagne, et que j'ai retrouvée au Maroc, est voisine de *maculatus* Fabricius; la femelle s'en distingue par sa taille plus faible, la forme du clypéus, la sculpture plus fine de la tête et du thorax, la ponctuation plus forte de l'abdomen, les antennes rougeâtres en dessous, la présence de 2 taches (au lieu d'une seule au milieu) sur le collare, le scutellum noir, la coloration rouge plus développée sur l'abdomen et les pattes.

Alyson Jurine

Alyson picteti Handlirsch. *a*: Maison Carrée, 4–7.vi, 2 ♂. *b*: Idni, 1 ♂.

Entomosericus Dahlbom

Entomosericus concinnus rufescens ssp. n. *a*: Tagramaret, 1 ♂. *c*: Taouiala, 1 ♀ (type).
J'ai vu également un ♂ et une ♀ du Maroc: Agadir, 24 et 25.iv.47 (ma coll.).

Le genre *Entomosericus* comprend, à ma connaissance, 2 espèces: *concinnus* Dahlbom du S-E. de l'Europe (Dalmatie, Corfou, Russie S. et Rhodes) et *kaufmanni* Radoszkowski, décrit de l'Asie centrale, signalé aussi de l'Europe du S-E. (Dobrudscha, Mehadia, Parnasse) par Handlirsch. La 2^{e} se distingue de la première par son abdomen et ses pattes en partie rouges, le dernier article des antennes du mâle plus long, foliacé.

J'ai examiné 3 mâles de *concinnus* de Rhodes et 1 mâle de « Same » (?) (Morice, 27.v.01, coll. von Schulthess); ce dernier se distingue par une ponctuation plus espacée, en particulier sur les 2 premiers tergites abdominaux.

Les individus de l'Afrique du nord que j'ai étudiés me semblent sans doute se rattacher à *concinnus*; la structure des antennes du mâle est semblable. Ils diffèrent de la forme typique par leur abdomen et leurs pattes en partie rouges (se rapprochant en cela de *kaufmanni*). Chez les femelles, les 3 premiers tergites sont ferrugineux, les tibias et les tarses le sont en partie; chez les mâles, le 1er ou les 2 premiers tergites sont clairs, ainsi que les genoux, les tibias et les tarses. Comparés aux individus de Rhodes, ces spécimens africains ont une ponctuation plus espacée et plus fine, ce que l'on remarque en particulier sur l'abdomen; sur le 2^{e} tergite, par exemple, les espaces sont nettement plus grands que les points. Notons encore que le mâle d'origine marocaine, plus petit que l'autre, a les articles du funicule plus grêles; il s'agit probablement d'un phénomène de croissance dysharmonique.

Astata Latreille

Astata (*Astata*) *boops* Schrank. *a*: Tagramaret, 4 ♂, 6 ♀. *c*: Taouiala, 1 ♀; Tadjemout, 1 ♂; Tadjerouna, 3 ♂, 3 ♀.
Astata (*Astata*) *affinis* Van der Linden. *a*: Tagramaret, 1 ♂.
Astata (*Astata*) *costai* Piccioli. *c*: Aflou, 1 ♂.

Le seul individu de la collection étant en mauvais état, la détermination est quelque peu douteuse.

Astata (*Astata*) *laeta* Saunders. *c*: Aflou, 1 ♀; Laghouat, v–vi, 2 ♂; Tadjerouna, 3 ♂, 2 ♀; Aïn Madhi, 4 ♀.

Saunders (1910) n'a vu qu'une femelle, de Biskra. Nadig (1933) a brièvement décrit, sous le nom de *Astata aff. laeta* une femelle d'Asni (Maroc), qui appartient à une espèce que je décrirai ailleurs et un mâle de Marrakech, qui est un vrai *laeta*. Outre les spécimens de la collection Guichard, j'ai examiné un certain nombre d'exemplaires de Tunisie (Sfax, coll. von Schulthess) et du Maroc (Marrakech, Goulimine; coll. Naef, ma coll.); une des femelles a été comparée par M. Benson avec le type de Saunders.

L'espèce est voisine de *costai* Piccioli. La femelle s'en distingue en particulier par la coloration rouge beaucoup plus étendue sur les pattes et par les derniers articles du funicule plus longs, le mâle par la zone brillante plus étendue en avant de l'ocelle antérieur, les articles du funicule moins nettement bisinués, les épimères mésothoraciques plus brillants, les poils des derniers sternites plus longs; la coloration ferrugineuse est parfois très peu développée sur les pattes du mâle.

Astata (*Astata*) *radialis* Saunders. *c*: Tadjemout, 1 ♂, 1 ♀; Tadjerouna, 4 ♂, 1 ♀.

L'espèce a été décrite d'après 5 femelles provenant de Bône et Le Tarf; Saunders (1910) décrit brièvement 1 mâle qu'il rattache avec doute à ces femelles et que Morice (1911) considère comme appartenant à une autre espèce. J'ai pu examiner un cotype de Saunders; l'étude de ce spécimen, de ceux de la collection Guichard et de 2 mâles du Maroc (Goulimine et Tafraout; ma coll.) me permet d'ajouter d'assez importants compléments à la description originale et de donner celle du mâle.

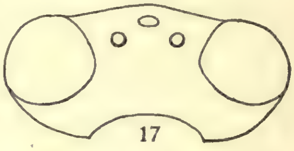


Fig. 17. *Astata radialis* Saunders ♀, tête vue par dessus.

La femelle est nettement caractérisée par sa tête très peu développée en arrière des yeux (fig. 17), par ses ocelles très proches des yeux (POL : OOL = 8 : 3,5), la ponctuation dense du mésonotum (les espaces presque partout plus petits que les points), l'aire pygidiale large et bordée de chaque côté de 5–6 soies seulement, la pilosité blanchâtre très développée, sans soies entremêlées, sur le corps et sur les pattes, les poils de la face inférieure des fémurs très longs (les plus développés sont beaucoup plus longs que la largeur du fémur). Le métatarse antérieur ressemble à celui de *minor* Kohl, mais les épines de l'arête externe sont plus longues; trochanters postérieurs avec une courte pointe à l'extrémité.

♂. 8–9. mm. Mandibules avec une petite zone jaunâtre avant l'apex, qui est d'un ferrugineux sombre; abdomen ferrugineux, avec les tergites 4–6 et les sternites 1–2 plus ou moins obscurcis; une petite tache à l'extrémité des fémurs, les tibias et les tarses ferrugineux; tegulae jaunâtres; ailes hyalines.

Mandibules sans dilatation au milieu de leur arête externe; 2^e article du funicule 4 fois plus long que large; articles 5–9 présentant à la face inférieure une très courte carène longitudinale à la base et une carène plus développée à l'extrémité; vues de profil, ces carènes ne sont que faiblement saillantes; un très petit espace brillant en avant de l'ocelle antérieur; le reste de la région périocellaire à ponctuation fine et assez dense. Mésonotum, à l'exception d'une petite zone médiane brillante, à ponctuation très dense, confluente; scutellum avec une zone brillante en avant, densément ponctué sur les côtés et en arrière; postscutellum entièrement chagriné; mésopleures chagrinées et striées; mésosternum brillant. Face supérieure du propodéum à réticulation beaucoup plus fine que chez *boops* Schrank. Trochanters postérieurs avec une courte pointe à l'extrémité; cellule radiale relativement courte, comme chez *costai* Piccioli. La pilosité, blanche et dressée, est beaucoup plus fournie que chez les autres espèces du sous-genre; sur les sternites 2–6, les poils sont de la longueur du 2ᵉ article des tarses postérieurs; il y a de plus des poils plus courts, denses, au milieu des sternites 4–6; comme chez la femelle, les poils des fémurs postérieurs sont très longs.

Astata (*Dryudella*) sp. *c*: Aïn Madhi, 2 ♀.

Mes connaissances actuelles ne me permettent ni de déterminer ni de décrire ces spécimens.

Larra Fabricius

Larra anathema Rossi. *c*: Tadjemout, 2 ♂.

Liris Fabricius

Liris nigra Van der Linden (= *pompiliformis* auct.). *a*: L'Arba, 1 ♀; Notre Dame du Mont, 2 ♀.

Liris nigrita Lepeletier. *a*: Maison Carrée, 13.i–15.ii, 1 ♂, 4 ♀.

Liris praetermissa Richards. *a*: Maison Carrée, 6–13.i, 10 ♀; Notre Dame du Mont, 5 ♀.

Tachytes Panzer

Tachytes frey-gessneri Kohl. *c*: Tadjemout, 1 ♂.

Tachytes maculicornis Saunders. *c*: Laghouat, v, 1 ♂.

Tachytes obsoletus Rossi. *a*: Tagramaret, 4 ♂, 1 ♀.

Tachytes europaeus Kohl. *a*: Maison Carrée, 9.vi.44, 1 ♀; Forêt de Bainem, 1 ♀.

Tachysphex Kohl

Tachysphex pygidialis Kohl. *a*: Sidi Ferruch, 1 ♀.

Tachysphex mocsaryi maroccanus Beaumont. *a*: Tagramaret, 3 ♂; Saïda, 1 ♀.

Les mâles ont le peigne du métatarse 1 très court.

Tachysphex palopterus Dahlbom. *c*: Laghouat, vi, 1 ♂.

La détermination est un peu douteuse.

Tachysphex notogoniaeformis Nadig. *a*: Bou Hanifia, 1 ♂.

Tachysphex mantivorus Beaumont. *c*: Tindouf, 1 ♂.

Tachysphex maidli Beaumont. *c*: Tadjerouna, 1 ♂, 1 ♀.

Tachysphex albocinctus Lucas. *a*: Maison Carrée, 19.vi.44, 1 ♂, 1 ♀. *c*: Tadjemout, 1 ♀.

Tachysphex dusmeti Giner. *c*: Tadjemout, 1 ♂.

Tachysphex schmiedeknechti Kohl. *c*: Laghouat, v, 1 ♂.

Tachysphex vestitus Kohl. *c*: Laghouat, v, 1 ♂.

Tachysphex adjunctus Kohl. *a*: Tagramaret, 1 ♂. *c*: Ifrane, 1 ♀.

Tachysphex nitidus Spinola. *a*: Tagramaret, 2 ♂, 1 ♀. *b*: Idni, 1 ♀. *c*: Colomb Béchar, 1 ♂; El Ahmar, 1 ♂.

Les spécimens de l'Afrique du nord ont les mésopleures très densément ponctuées.

Tachysphex tarsinus Lepeletier. *c*: Laghouat, vi, 1 ♀.

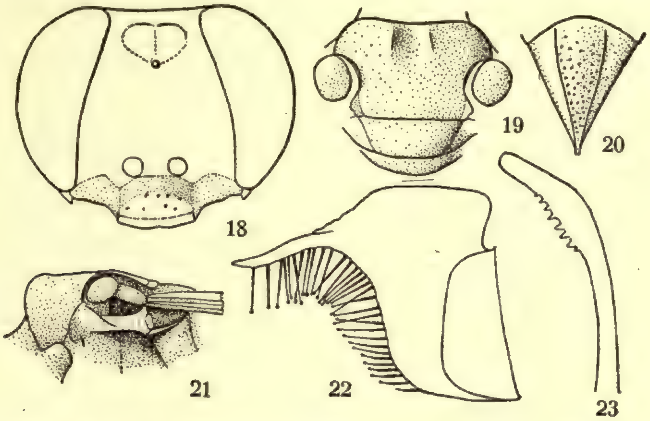
Tachysphex filicornis Kohl. *a*: Maison Carrée, iv.43, 1 ♂.

Tachysphex sulcidorsum sp. n. *c*: Laghouat, vi, 1 ♀ (type). Autres spécimens étudiés: Biskra, 14.v.98, 1 ♂ (coll. Morice, Muséum d'Oxford); id., 27–30.v.48, 3 ♀ (coll. Naef, ma coll.); Ksar es Souk (Maroc saharien), 2.vi.47, 3 ♂, 1 ♀ (coll. Naef, ma coll.).

♀. 7,5–9 mm. Sont ferrugineux: les mandibules, le bord antérieur et parfois une grande partie du clypéus, la face inférieure des scapes, les tubercules huméraux, les tegulae, l'abdomen et les pattes depuis l'extrémité des hanches; ailes hyalines, la nervulation ferrugineuse à la base, brun foncé vers l'extrémité. Face et base du clypéus à pilosité argentée couchée assez dense, cachant les téguments sur le bas de la face; disque du mésonotum avec des poils blancs, courts et épais, pas très denses, ne cachant pas la sculpture; côtés du mésonotum et mésopleures à pilosité argentée couchée dense; propodéum à pilosité demi-dressée, laissant voir la sculpture; les 5 premiers tergites avec des bandes de pruinosité argentée, relativement peu développées.

La tête, vue de face, est large, avec le vertex très légèrement concave (fig. 18); clypéus avec une aire apicale brillante un peu plus longue que l'aire basale ponctuée; la lamelle assez régulièrement arquée, à peine échancrée au milieu; 2^e article du funicule 2½ fois, le 3^e et les suivants 3 fois plus longs que larges; face, en avant de l'ocelle antérieur, et vertex brillants, avec une ponctuation moyennement forte, nette, les espaces par endroits plus grands que les points; en arrière des ocelles postérieurs, une impression nette, en V très ouvert; la distance interoculaire égale presque la longueur des articles 2+3 du funicule; tempes peu développées. Mésonotum de structure particulière (fig. 19); dans sa partie antérieure, il montre deux petites carènes longitudinales limitant une zone très nettement déprimée; ses bords latéro-postérieurs se soulèvent assez fortement en une lamelle jaunâtre, terminée en arrière par un lobe échancré; sa surface est brillante, avec une ponctuation moyennement forte et très nette, les espaces par endroits beaucoup plus grands que les points, à d'autres pas beaucoup plus grands que ceux-ci; scutellum à ponctuation semblable, espacée; mésopleures brillantes, à ponctuation plus fine et plus dense que sur le mésonotum; leur partie supérieure s'enfonce sous une lamelle chitineuse jaunâtre, qui forme une sorte de pont (fig. 21); la partie supérieure des métapleures est terminée par une lame horizontale fortement saillante; vue par dessus, celle-ci forme dans sa partie postérieure un lobe arrondi. Face dorsale du propodéum avec une striation longitudinale assez fine et irrégulière; faces latérales plus régulièrement striées obliquement; face postérieure à striation transversale fine et irrégulière, avec une profonde fossette allongée; 5^e tergite sans longues soies avant sa dépression terminale, qui n'est pas nettement limitée; aire pygidiale très étroite et allongée, finement striolée, avec de très petits points espacés (fig. 20). Cellule radiale relativement peu tronquée à l'extrémité, la 3^e cubitale fortement étirée. Pattes élancées, avec des épines pâles assez longues; tibia 1 avec une seule longue épine à l'extrémité; peigne formé d'épines longues et fines; on en compte 9–10 sur le métatarse; aux pattes 2, le tibia est aussi long que les articles 1+2+½3; le métatarse porte de nombreuses épines; aux pattes 3, le tibia est aussi long que les 3 premiers articles des tarses; le métatarse porte quelques petites épines; l'avant-dernier article des tarses est 1¼ fois aussi long que large.

♂. 5, 5–6 mm. Coloration ferrugineuse moins développée que chez la femelle; sont de cette couleur: les mandibules, une tache à la face inférieure des scapes, les tubercules huméraux, les tibias et les tarses; chez l'individu le plus clair, les 3 premiers segments abdominaux sont rouges; chez les plus foncés, cette couleur ne s'étend que sur les côtés des 2 premiers tergites et sur les sternites correspondants; dépression terminale des segments jaunâtre.



FIGS. 18–23. *Tachysphex sulcidorsum* sp. n. 18. ♀, tête vue de face. 19. ♀, thorax, face dorsale. 20. ♀, aire pygidiale. 21, thorax vu de côté. 22. ♂, volsella de l'armature génitale. 23. ♂, crochet.

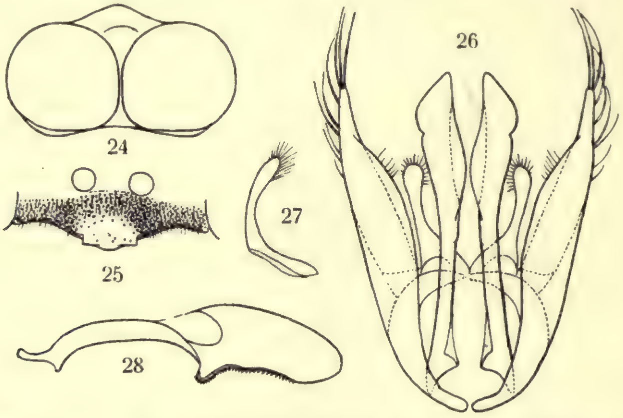
Forme générale de la tête comme chez la femelle; le clypéus est un peu plus bombé avec une lamelle plus étroite; articles du funicule beaucoup plus courts; le 2^e à peu près aussi long que large à l'extrémité, le 3^e 1½ fois aussi long que large, le 4^e presque aussi long que les 2 précédents réunis, 2 fois plus long que large; la distance interoculaire égale à peu près la longueur des articles 2+3+4 du funicule. Structure et sculpture du thorax comme chez la femelle, la ponctuation des mésopleures cependant beaucoup plus espacée; au fond de la gouttière antérieure du mésonotum, on distingue 2 petites carènes longitudinales. Dernier tergite mat, à ponctuation très fine et très dense. Pattes beaucoup moins épineuses que chez la femelle; tarses 1 sans peigne. Les figures 22 et 23 montrent la volsella et le crochet d'un individu de Biskra; chez un individu de Ksar es Souk, les dents du crochet sont moins nombreuses.

Cette espèce doit se placer au voisinage de *speciosissimus* Morice, dont elle se distingue, outre les caractères très particuliers du mésonotum et des côtés du thorax, par la cellule radiale beaucoup moins tronquée, les épines des pattes moins longues, l'aire pygidiale plus étroite, la sculpture.

Prosopigastra Costa

Prosopigastra (*Prosopigastra*) *gaetula* sp. n. *c*: Laghouat, v, 1 ♂ (type).

♂. 9,5 mm. Mandibules jaunâtres à pointe foncée; bord postérieur des tubercules huméraux d'un ferrugineux très sombre; abdomen ferrugineux, le 1^{er} tergite avec deux taches noires à la base; une petite tache à l'extrémité des fémurs, les tibias et les tarses ferrugineux; tibias 1 et 2 un peu rembrunis au milieu; tegulae jaunâtres; ailes hyalines, légèrement jaunâtres dans leur partie médiane, les nervures jaunâtres à la base, brunes à l'apex. Le seul individu examiné était assez usé et il est difficile de savoir quelle est la densité de la pilosité; celle-ci est en tous cas beaucoup plus développée que chez *punctatissima* Costa, et il est probable que, chez les individus frais, elle cache en grande partie la sculpture de la face et des mésopleures.



FIGS. 24–8. *Prosopigastra gaetula* sp. n., ♂. 24. Tête vue par dessus. 25. Clypéus. 26. Armature génitale. 27. Volsella, face externe. 28. Crochet, face interne.

La zone apicale du clypéus est très brillante, avec quelques points isolés, tout à fait aplatie, ses angles antérieurs droits, son bord antérieur légèrement arqué (fig. 25). Articles basaux du funicule non renflés en dessous, le 2^e $2\frac{1}{4}$ fois aussi long que large, le 3^e égalant les $\frac{2}{3}$ du 2^e; tubercule facial avec des traces peu visibles de sillon médian; face à ponctuation plus fine et plus dense que chez *punctatissima*; tubercule ocellaire brillant, à ponctuation espacée; au vertex, les yeux se touchent presque sur une assez grande longueur (fig. 24); ils ne sont séparés que par une zone 2 fois plus étroite que le funicule; vue par dessus, la tête est rétrécie immédiatement derrière les yeux; tempes brillantes, à ponctuation très fine et très espacée. La ponctuation du mésonotum est assez fine (beaucoup plus fine que chez *punctatissima*); dans la partie antérieure, sur les côtés, en dehors des sillons parapsidaux et au milieu de la partie antérieure du disque, elle est dense, avec des espaces presque partout plus petits que les points; sur les côtés du disque et dans la partie postérieure, elle est très espacée, avec des espaces beaucoup plus grands que les points; scutellum avec quelques points isolés; postscutellum avec d'étroits espaces brillants entre les points; mésopleures réticulées; mésosternum, vu de profil, avec les deux saillies habituelles;

l'antérieure est plus large que haute. L'aire dorsale du propodéum n'est pas nettement limitée; dans son tiers antérieur, elle montre des carènes, perpendiculaires au bord antérieur, droites et assez régulières; dans les $\frac{2}{3}$ postérieurs, la réticulation est irrégulière. Premier tergite à ponctuation très fine et très dense au milieu (beaucoup plus fine que chez *punctatissima*); la ponctuation devient de moins en moins dense vers l'extrémité de l'abdomen; dépression terminale du 2^e tergite à ponctuation très espacée, celle du 3^e tergite presque sans points; 7^e tergite relativement court, assez largement arrondi à l'extrémité, ne portant que quelques points isolés; 2^e sternite très brillant, avec de très petits points très espacés; sternites 3, 4 et 5 avec un bourrelet brillant, interrompu au milieu sur le 3^e; sternites 6 et 7 ne portant de poils que près de leur bord postérieur. Epines des pattes un peu moins développées que chez *punctatissima.* Les figures 26 à 28 montrent l'ensemble et les détails de l'armature génitale.

Cette espèce est bien caractérisée par sa grande taille et sa distance interoculaire très faible; par sa taille et par la forme de son clypéus, elle se rapproche d'*angustifrons* Schulthess, mais s'en distingue, outre la faible distance interoculaire, par ses fémurs noirs, la ponctuation espacée des tempes, la sculpture du propodéum, la pilosité peu développée des derniers sternites, l'armature génitale. Il n'est pas exclu que ce mâle soit celui d'*insignis* Saunders, décrit d'après une seule femelle de Biskra; cette dernière a cependant les pattes entièrement rouges et je serais plutôt tenté de la rattacher à *angustifrons*, dont le mâle seul a été décrit.

Prosopigastra (*Homogambrus*) sp. *c*: Laghouat, vi, 1 ♂.

Un individu, malheureusement sans tête et qui doit appartenir à une espèce non décrite.

Palarus Latreille

Les indications relatives aux espèces de ce genre sont données dan sun travail déjà publié (de Beaumont, 1949).

Palarus rufipes Latreille. *b*: Kasba Tadla, 1 ♂, 2 ♀. *c*: Tadjemout, 3 ♂.
Palarus ambustus Klug. *c*: Laghouat, vi, 4 ♀; Tadjemout, 3 ♂, 5 ♀; Aïn Madhi, 1 ♂.
Palarus confusus Turner. *c*: Aflou, 1 ♂, 1 ♀; Taouiala, 1 ♂, 9 ♀.
Palarus hastatifrons africanus Beaumont. *c*: Tadjemout, 1 ♂, 1 ♀.
Palarus parvulus Beaumont. *c*: Laghouat, vi, 1 ♀.

Miscophus Jurine

Je n'ai pas encore étudié les espèces nord-africaines de ce genre très difficile.

Miscophus sp. aff. handlirschi Kohl. *a*: Tagramaret, 1 ♀.
Miscophus sp. *b*: Route Tiznit-Agadir, 1 ♀.

Trypoxylon Latreille

Trypoxylon figulus Linné. *a*: Maison Carrée, 5.v.43, 1 ♂.
Trypoxylon clavicerum Lepeletier. *a*: Maison Carrée, 12.v.43, 1 ♂; Collo, 1 ♂.
Trypoxylon scutatum Chevrier. *a*: Tagramaret, 2 ♀.

Psen Latreille

Psen grandii Maidl. *a*: Orleansville, 1 ♂.

Psenulus Kohl

Psenulus sp. *c*: Laghouat, v–vi, 2 ♀.

Ces individus appartiennent à une espèce voisine de *pallipes* Panzer et de *fuscipennis* Dahlbom. Je préfère attendre d'avoir vu un matériel plus abondant avant de les décrire.

Pemphredon Latreille

Pemphredon (*Cemonus*) *rugifer* Dahlbom. *c*: Aflou, 18 ♂, 2 ♀.

On sait que cette espèce varie notablement et qu'en Europe, l'on peut distinguer 3 types de femelles, caractérisés surtout par la forme de l'échancrure du clypéus: *rugifer s.s.*, *wesmaeli* Morice et *scoticus* Perkins. Les individus de la collection Guichard présentent toutes les caractéristiques principales de l'espèce: grande taille, forte ponctuation du thorax, fortes épines des tibias postérieurs, clypéus de la femelle avec une échancrure au bord antérieur, aire pygidiale étroite, nettement bordée, avec une petite carène médiane dans sa partie postérieure, 7^{e} tergite du mâle nettement ponctué. Ils diffèrent des individus d'Europe par une ponctuation moins dense sur le mésonotum et le scutellum et par l'échancrure du clypéus de la femelle, en quart de cercle, avec une petite dent médiane (fig. 29). Il serait intéressant de savoir si cette forme est constante en Afrique du nord.

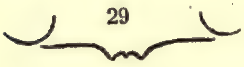


FIG. 29. *Pemphredon rugifer* Dahlbom, ♀, bord antérieur du clypéus.

Pemphredon (*Cemonus*) *austriacus* Kohl. *a*: Maison Carrée, 1 ♀.

La détermination de cet unique individu n'est pas certaine, mais c'est sans doute de l'espèce de Kohl qu'il se rapproche le plus.

Pemphredon (*Cemonus*) *lethifer* Shuckard. *a*: Maison Carrée, 30.iii–7.iv.43, 1 ♂, 1 ♀. *b*: Ifrane, 1 ♂.

Diodontus Curtis

Diodontus punicus (André) Gribodo. *a*: Maison Carrée 15 et 23.ii., 30.iii–7.iv.43, 15 ♂, 3 ♀.

Les individus de la collection Guichard correspondent à cette espèce, telle qu'elle est définie par Morice (1911).

Diodontus friesei Kohl. *a*: Maison Carrée, iv.43, 3 ♂.

La détermination n'est pas certaine.

Diodontus sp. *a*: Maison Carrée, iv, 3 ♂.

Ces individus ressemblent à *luperus* Shuckard, mais ne me semblent pas correspondre à *schmiedeknechti* Kohl. Les tibias sont noirs, sauf la face antérieure de ceux de la 1ère paire, qui est jaune.

Passaloecus Shuckard

Passaloecus insignis Linden. *a*: Maison Carrée, 30.iii–7.iv.43, 1 ♂.

Il s'agit de cette espèce ou d'une forme très voisine.

Ammoplanus Giraud

Ammoplanus maidli Gussakovskij. *a*: Maison Carrée, 23.ii.43, 4 ♂, 3 ♀.

La détermination est légèrement douteuse, la femelle seule, moins caractéristique que le mâle, ayant été décrite. D'après Gussakovskij, elle se distingue de *perrisi* Giraud par la taille plus grande, les tubercules huméraux blancs, la sculpture du propodéum plus faible et la forme de la tête. Ce dernier caractère variant beaucoup avec la taille, l'on ne peut pas y attacher une grande importance; les autres caractères correspondent bien à ce que l'on voit chez les spécimens de la collection Guichard.

Le mâle diffère de celui de *perrisi* par la moitié inférieure de la face entièrement jaune, la présence de grandes taches jaunes à la face inférieure de la tête, les antennes et les pattes plus claires, les angles latéraux de l'échancrure médiane du clypéus moins accusés, la saillie médiane, très variable avec la taille, de forme différente, les côtés du propodéum mats, finement striés.

Je donnerai ailleurs sur cette espèce (dont j'ai également vu un mâle du Moyen Atlas) des renseignements plus complets; je connais une espèce voisine, des environs de Mogador.

Dans les renseignements qu'il m'a transmis, M. Guichard note: « I recollect catching *Diodontus* and *Ammoplanus* during February and March entering holes in the vertical face of a small sandpit used as a rubbish-dump in the grounds of the Ecole Agricole. »

Crabro Fabricius

Crabro (*Solenius*) *continuus* Fabricius. *a*: Collo, 1 ♂. *c*: Taouiala, 1 ♂.

Crabro (*Solenius*) *hypsae* Destefani. *a*: Maison Carrée, 4–7.v.43, 1 ♀; Berroughia, vi, 1 ♂; Michelet, 1 ♀. *b*: Aïn Tafentecht, 1 ♂; Idni, 2 ♂, 1 ♀.

Crabro (*Solenius*) *impressus* Smith. *a*: Berroughia, vi, 1 ♂; Saïda, 1 ♂. *b*: Ifrane, 1 ♂.

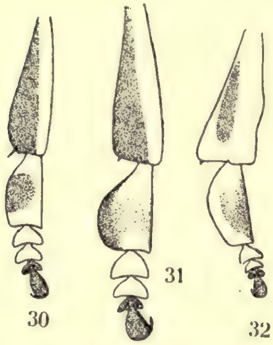
Crabro (*Clypeocrabro*) *clypeatus* Schreber. *a*: Maison Carrée, iv.43, 1 ♂. *c*: Aflou, 1 ♂; Taouiala, 1 ♂; Laghouat, 1 ♂; Tadjemout, 3 ♂, 3 ♀.

Crabro (*Crossocerus*) *tarsatus richardsi* ssp. n. *a*: Maison Carrée, 30.iii–7.iv.43, 2 ♂ (dont le type). J'ai étudié également un ♂ de l'oasis de Tinerhir (Maroc saharien), 4.vi.47 (ma coll.).

Richards (1935) a montré, par l'examen du type, que le *C. palmipes* Linné était l'espèce généralement nommée *palmarius* Schreber; *palmipes* auct. nec Linné doit se nommer *tarsatus* Shuckard. L'étude de quelques exemplaires nord-africains me donne l'occasion de signaler la variation géographique de cette espèce.

Grâce à l'obligeance de M. Richards, je suis en possession d'un mâle de *tarsatus* d'origine anglaise et j'ai constaté que ses pattes antérieures diffèrent notablement de celles des individus que l'on rencontre généralement en Europe continentale (fig. 30).

Le métatarse est relativement peu dilaté, un peu plus de 2 fois aussi long que large; les autres articles des pattes antérieures sont relativement peu élargis; les fémurs, vus par dessous, sont environ 2,4 fois plus longs que larges. D'après M. Richards, ce serait là la forme habituelle en Angleterre et qui doit être considérée comme *tarsatus* typique. Je possède un mâle de la France méridionale (Banyuls-sur-Mer) dont les pattes antérieures sont tout à fait semblables à celles de l'individu décrit ci-dessus.



FIGS. 30–2. *Crabro tarsatus* Shuckard, ♂, patte antérieure. 30. Forme typique, d'Angleterre. 31. Exemplaire de Suisse. 32. *ssp. richardsi*, Afrique du nord.

Par contre, les individus des Pays-Bas, de Suisse, de Moravie et de Chypre que j'ai pu examiner ont les pattes antérieures plus fortement élargies (fig. 31). Le métatarse est moins de 2 fois aussi long que large; les autres articles des pattes sont plus dilatés aussi; les fémurs, vus par dessous, sont environ 2,15 fois plus larges que longs. Cette forme est celle qui est figurée par Kohl (1915) et par Berland (1925). Il semble que ces individus représentent une sous-espèce géographique de *tarsatus* pour laquelle, d'après la synonymie établie par Kohl, aucun nom ne serait disponible. J'hésite cependant à la nommer pour le moment, avant de connaître son aire de répartition, de savoir si elle est reliée par des intermédiaires avec la forme typique et si elle correspond peut-être à l'un des *Crabro* d'anciens auteurs dont l'identité certaine n'a pas été établie.

D'Afrique du nord, j'ai étudié 3 mâles (dont l'un en très mauvais état et sans pattes antérieures), provenant de deux localités très distinctes, mais qui ont des pattes antérieures semblables et différant nettement de celle des 2 types précédents (fig. 32). Le métatarse est relativement peu dilaté, rétréci vers l'extrémité; les autres articles des tarses sont également peu dilatés; par contre, les trochanters, fémurs et tibias sont nettement plus dilatés que chez les exemplaires européens; les fémurs, vus par dessous, sont exactement 2 fois plus longs que larges; il y a également des différences dans la disposition des dessins noirs. Par la forme de ses métatarses, cette forme se rapproche de *varius* Lepeletier, mais s'en distingue, comme *tarsatus* type, par l'éperon des tibias I noir et par la ponctuation plus espacée du mésonotum.

Il est évidemment difficile de savoir s'il faut assigner à cette forme un rang spécifique; je préfère, pour le moment du moins, la considérer comme sous-espèce de *tarsatus* et je suis heureux de la dédier à M. O. W. Richards, en témoignage de reconnaissance pour les services qu'il m'a fréquemment rendus.

Crabro (*Tracheliodes*) *quinquenotatus* Jurine. *a*: Maison Carrée, iv–v.43, 1 ♂, 4 ♀. *c*: Laghouat, vi, 1 ♂.

Crabro (*Entomognathus*) *brevis* Van der Linden. *a*: Maison Carrée, 4–7.v.43, 1 ♂. *c*: Aflou, 2 ♀; Taouiala, 1 ♀; Laghouat, vi, 1 ♂.

Ces spécimens appartiennent à la forme que cite Kohl (1915) et chez qui la coloration jaune est très développée; sont de cette couleur: les scapes, le collare et les tubercules huméraux, le postscutellum (sauf chez un mâle), l'extrémité des fémurs, les tibias et les tarses; les femelles sont de relativement grande taille: 6 mm.

Oxybelus Latreille

Oxybelus lamellatus Olivier. *c*: Laghouat, vi, 2 ♀; Tadjemout, 1 ♂, 1 ♀; Tadjerouna, 1 ♀.

A ma connaissance, 4 espèces d'*Oxybelus* du groupe de *lamellatus*, caractérisées entre autres par leur mucron foliacé, habitent l'Afrique du nord. Deux d'entre elles ont les lamelles du postscutellum bifides à l'extrémité et une ponctuation abdominale très forte; je les nomme *lamellatus* Olivier et *arabs* Lepeletier. Les deux autres ont des lamelles simples et une ponctuation abdominale fine; ce sont *phyllophorus* Kohl et *diphyllus* Costa; *pharao* Kohl peut être considéré comme sous-espèce égyptienne de *diphyllus*.

La synonymie des 2 premières espèces est difficile à établir. La description d'Olivier ne s'applique pas entièrement à l'espèce que je nomme, à la suite de divers auteurs, *lamellatus* Olivier. La description d'*arabs* Lepeletier est suffisante pour reconnaître l'espèce, dont *frondiger* Costa (dont j'ai étudié les types) est un synonyme certain; mais il est possible que le nom plus ancien d'*andalusiacus* Spinola doive s'appliquer à cette espèce.

Quoi qu'il en soit, *lamellatus* et *arabs* sont deux espèces très voisines; la première se distingue de la 2^e par la ponctuation plus fine du mésonotum et des mésopleures, la pilosité argentée plus développée, le mucron plus plat et moins échancré à l'extrémité, le postscutellum entièrement jaune et quelques autres caractères de coloration. Je connais *lamellatus* de Chypre, de Palestine et de toute l'Afrique du nord, de l'Egypte au Maroc; *arabs* se rencontre de la Tunisie au Maroc, en Espagne, dans la France méridionale, en Corse et en Sardaigne.

Oxybelus phyllophorus Kohl. *c*: Tadjemout, 1 ♀.

J'ai pu comparer la femelle de la collection Guichard aux types de Kohl. L'espèce est bien caractérisée par son mucron fortement élargi en arrière, profondément échancré en angle aigu à l'extrémité, avec de nombreuses et fines stries longitudinales; tibias entièrement ou presque entièrement d'un jaune blanchâtre.

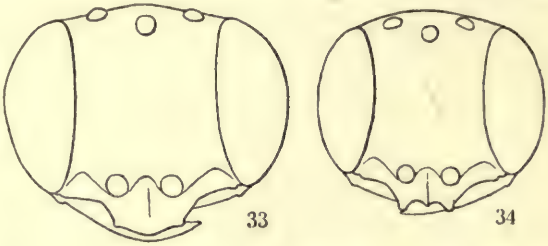
Oxybelus spectabilis Gerstaecker. *c*: Aflou, 1 ♂.

Oxybelus guichardi sp. n. *c*: Tadjerouna, 3 ♂, 4 ♀, une des ♀ désignée comme type.

♀. 7–7,5 mm. Insecte fortement taché de jaune doré. Mandibules jaunes, à pointe ferrugineuse et noire; tout le clypéus jaune, avec le bord antérieur de sa partie médiane noirâtre ou ferrugineux; scapes jaunes, funicules d'un ferrugineux clair. Sont jaunes sur le thorax: le prothorax, parfois les bords latéraux du mésonotum, le scutellum, le postscutellum entre les lamelles et la partie interne de celles-ci, le fond du mucron, la partie antérieure des mésopleures (épisternes), les métapleures, 2 taches au mésosternum, le métasternum, une grande tache dans la partie supérieure du propodéum, autour de la base du mucron, les faces latérales de ce segment. Abdomen jaune; 2 taches sur la base déclive du 1^{er} tergite et la base des tergites suivants noirâtres; sternites un peu obscurcis. Tegulae transparentes avec une tache jaune; plaque précostale et nervulation d'un jaune pâle. Hanches jaunes; trochanters ferrugineux clair, de même que les fémurs; fémurs 1 et 2 avec la face inférieure plus ou moins jaune, fémurs 3 avec une tache apicale jaune; tibias jaunes, ceux de la 3^e

paire ferrugineux clair à la face interne et au milieu de la face externe ; tarses jaunes, plus ou moins ferrugineux.

La tête, vue de face, est large (fig. 33), la largeur d'un œil égalant la moitié de celle du front. Partie médiane du clypéus montrant dans sa partie basale une carène longitudinale à profil régulièrement et assez faiblement arqué ; la partie antérieure est légèrement relevée, le bord antérieur lui-même de forme un peu variable, mais sans dents avant ses angles latéraux. Face à ponctuation fine et dense ; entre les ocelles, la ponctuation est moins serrée, avec des espaces plus grands que les points. La tête est fortement rétrécie derrière les yeux, avec des tempes peu développées. Mésonotum à ponctuation assez fine et dense, les espaces presque partout plus petits que les points ; scutellum à ponctuation plus forte et plus espacée, avec une carène longitudinale médiane n'atteignant pas toujours son bord antérieur, sans stries dans sa partie postérieure ; mésopleures assez irrégulièrement réticulées ; partie médiane du mésosternum brillante, avec de petits points séparés par des espaces plus grands qu'eux-mêmes. Postscutellum avec une seule carène longitudinale ; les lamelles sont nettement bifides à l'extrémité, le lobe supérieur étant situé plus près de la ligne médiane que la pointe inférieure. Mucron en gouttière assez large, son fond avec des stries transversales, son extrémité élargie et très faiblement échancrée. Tergites à ponctuation assez fine et serrée, les espaces en moyenne de la grandeur des points ; 2ᵉ sternite brillant, à ponctuation fine, espacée et irrégulière. La spinulation des pattes est plus développée que chez les autres espèces, formée d'épines pâles, minces et longues, qui semblent se briser facilement ; le métatarse 1 porte 7–8 épines, l'apex de la première atteignant le milieu du 3ᵉ article ; le métatarse 2 porte sur sa face supérieure une dizaine d'épines dont les plus longues, légèrement courbées, sont aussi longues que les $\frac{2}{3}$ du 2ᵉ article ; le métatarse 3 montre aussi, parmi des poils sétiformes, d'assez nombreuses épines pâles, fines et courbées. La pilosité de la tête et du thorax, argentée et tout à fait couchée, est bien développée, cachant à peu près les téguments sur la face et sur le mésonotum.



FIGS. 33–4. *Oxybelus guichardi* sp. n., tête vue de face. 33. ♀. 34. ♂.

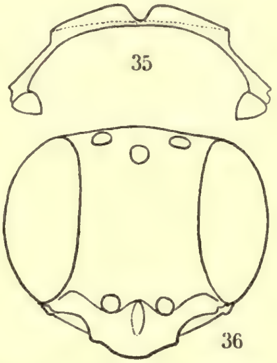
♂. 6,5 mm. Tête et thorax colorés comme chez la femelle, la couleur jaune étant cependant plus étendue sur le mésosternum. Sur l'abdomen, la base déclive du 1ᵉʳ tergite est entièrement noire ; les tergites suivants ont leur moitié basale noire, leur moitié terminale jaune, les deux couleurs étant limitées à peu près en ligne droite. Fémurs tachés de noir ; tibias et tarses entièrement jaunes.

Clypéus à bord antérieur tridenté (fig. 34), la dent médiane nettement plus courte que les latérales; vue de profil, la carène médiane est régulièrement et faiblement arquée. Sculpture comme chez la femelle. Tergites avec des pointes latérales translucides. Pas de pilosité particulière aux sternites. Peigne formé de longues épines, celle qui est située à l'extrémité du métatarse atteignant l'extrémité du 2e article. La spinulation des pattes est moins développée que chez la femelle, mais plus qu'elle ne l'est généralement chez les mâles de ce genre; le métatarse 2 porte quelques longues épines sur sa face dorsale.

Cette belle espèce, que je me fais un plaisir de dédier à Monsieur Guichard, est facilement reconnaissable au grand développement de la couleur jaune (clypéus, mésopleures, propodéum, etc.), ainsi qu'à l'abondance des épines des pattes.

Oxybelus verhoeffi sp. n. *c*: Tadjemout, 1 ♀ (type); Laghouat, vi, 1 ♀. J'ai aussi examiné une ♀ de Biskra, 31.v.48 (ma coll.).

♀. 6,5 mm. Mandibules jaune pâle, avec la pointe ferrugineuse et noire; la moitié antérieure de la partie médiane du clypéus, parfois aussi toute la carène médiane, d'un jaune plus ou moins ferrugineux; scapes jaunes, funicules ferrugineux. Sont jaunes sur le thorax: le collare et les tubercules huméraux, 2 grandes taches, parfois réunies, sur le scutellum, le postscutellum entre les lamelles et la partie interne de celles-ci, le fond du mucron. Abdomen d'un jaune assez clair à la base, devenant plus ferrugineux vers l'extrémité; base déclive du 1er tergite noire; 2e tergite portant de chaque côté, à la base, et parfois aussi au milieu, une tache noire à contour mal défini; 3e tergite montrant des taches semblables; 4e tergite noirâtre à la base. Tegulae transparentes, avec une tache jaune; plaque précostale et nervures à la base des ailes d'un ferrugineux-jaunâtre uniforme. Pattes jaunes, teintées de ferrugineux clair par endroits; la face supérieure des fémurs rembrunie.



FIGS. 35–6. *Oxybelus verhoeffi* sp. n., ♀. 35. Collare vu de derrière. 36. Tête vue de face.

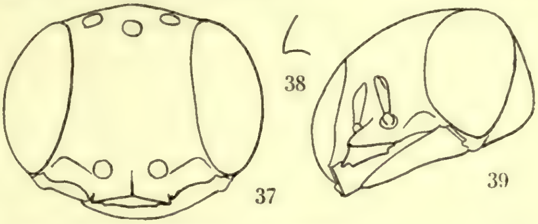
Tête, vue de face (fig. 36), un peu plus large que haute; la largeur d'un œil est un peu supérieure à celle de la moitié du front. Partie médiane du clypéus portant dans le haut une carène courte et épaisse, qui fait fortement saillie lorsqu'on l'examine de profil; son bord antérieur fortement arqué, sans dents avant les angles latéraux. Face à ponctuation fine et dense, devenant moins serrée entre les ocelles, où les espaces sont par endroits plus grands que les points. Tête bien développée en arrière des yeux, à peu près comme chez *pugnax* Olivier. Le bord antérieur du collare est soulevé, comme chez *collaris* Kohl, en une lamelle verticale transparente, fortement échancrée au milieu (fig. 35), et dont le sommet dépasse nettement le niveau du mésonotum. Ponctuation de ce dernier moyennement forte et dense, les espaces presque partout plus petits que les points; scutellum à ponctuation un peu plus forte et plus espacée, avec une forte carène médiane et quelques courtes stries, peu visibles, dans sa partie postérieure; mésopleures fortement réticulées; mésosternum peu brillant, avec une ponctuation de base microscopique et quelques gros points isolés. Postscutellum avec une carène médiane, accompagnée de chaque côté de 2–3 carènes parallèles; lamelles nettement bifides à l'extrémité, le lobe supérieur plus long que la pointe inférieure; mucron en gouttière assez large, son fond avec des stries arquées, s'élargissant vers l'extrémité, qui est nettement incisée. Tergites à ponctuation moyenne et dense, les espaces plus petits que les points; milieu du 2^e^ sternite à ponctuation assez forte et espacée. Peigne formé d'épines assez longues et grêles; le métatarse en porte 6–7, l'apex de la 1^ère^ dépassant l'extrémité du 2^e^ article; métatarse 2 avec 3–4 longues épines sur sa face dorsale; métatarse 3 portant au plus 1–2 très petites épines. La pilosité, argentée, est tout à fait couchée sur la face et le mésonotum; sur ce dernier, elle ne cache pas les téguments.

C'est à mon collègue, Monsieur P. M. F. Verhoeff, auteur d'une récente monographie sur les *Oxybelus* (1948), que je suis heureux de dédier cette espèce. Elle présente en commun avec *collaris* Kohl le grand développement du collare, mais se distingue facilement de cette espèce par les dessins, d'un jaune doré, très étendus, la forme du clypéus, la structure du postscutellum et du mucron, etc.

Oxybelus palmetorum sp. n. *c*: Tadjemout, 1 ♀ (type).

♀. 7 mm. Mandibules d'un jaune blanchâtre, la pointe ferrugineuse et noire; scapes jaunes (funicules brisés). Les dessins du thorax et de l'abdomen sont d'un jaune citron assez pâle et comprennent: le collare et les tubercules huméraux, 2 grandes taches, se touchant au milieu, sur le scutellum, le postscutellum entre les lamelles et la partie interne de celles-ci, les bords latéro-postérieurs du scutellum et du postscutellum, le fond du mucron, des bandes sur les tergites 1–5, la 1^ère^ échancrée au milieu, la 2^e^ échancrée au milieu et sur les côtés, les suivantes rétrécies sur les côtés, les sternites 1–4; dépression terminale du 5^e^ tergite, 6^e^ tergite, 5^e^ et 6^e^ sternites d'un ferrugineux clair. Tegulae transparentes avec une tache jaune; plaque précostale d'un jaune pâle uniforme; nervures des ailes jaunâtres à la base, brunes vers l'extrémité. Hanches et trochanters noirs, à peine tachés de jaune; fémurs 1 avec une tache jaune sur la moitié apicale de leur face inférieure; fémurs 2 jaunes sur toute leur face inférieure et sur l'extrémité de leur face supérieure; fémurs 3 jaunes avec une strie noire sur leur face supérieure; tibias jaunes, ceux de la 3^e^ paire tachés de ferrugineux et de brun sur leur face interne et sur la moitié apicale de leur face externe; tarses jaunes, teintés de ferrugineux.

Tête, vue de face (fig. 37) nettement plus large que haute; la largeur d'un œil est un peu supérieure à celle de la moitié du front. Le clypéus présente une structure assez particulière; il est tectiforme, la carène médiane, vue de profil, étant très légèrement arquée (fig. 38); sous l'avant-toit ainsi formé se trouve une surface en triangle aplati, presque horizontale (fig. 39). Face brillante, à ponctuation fine et pas très serrée, les espaces par endroits plus grands que les points. Tête fortement rétrécie derrière les yeux; tempes à ponctuation fine et dense et présentant dans le bas une abondante pilosité. Mésonotum brillant, à ponctuation moyenne, nette, les espaces, au moins en arrière, plus grands que les points; scutellum à ponctuation semblable, avec une carène médiane continue et quelques courtes carènes dans sa partie tout à fait postérieure. Mésopleures brillantes; leur partie antérieure (épimère) ponctuée et réticulée; leur partie supérieure réticulée; leur partie inférieure, depuis le sillon horizontal, avec une ponctuation fine et espacée, les espaces nettement plus grands que les points; sur le mésosternum, ces points deviennent plus serrés. Postscutellum avec une seule carène longitudinale; les lamelles, faiblement bifides à l'extrémité, sont cependant assez écartées l'une de l'autre. Mucron en gouttière large, à bords presque droits, s'élargissant un peu vers l'extrémité, qui est nettement incisée. Tergites à ponctuation très fine et espacée, les espaces plus grands que les points; 2e sternite brillant, à ponctuation assez fine, devenant très espacée au milieu. Les épines antérieures du métatarse (les autres sont brisées) assez longues; leur apex dépasse légèrement l'extrémité du 2e article; métatarse 2 montrant sur sa face dorsale 2 longues épines (outre les apicales); métatarse 3 sans épines sur sa face dorsale. Pilosité argentée tout à fait couchée, peu dense, ne cachant pas du tout la sculpture du mésonotum, laissant voir celle de la face.



FIGS. 37–9. *Oxybelus palmetorum* sp. n., ♀. 37. Tête vue de face. 38. Profil de la ligne médiane du clypéus. 39. Tête vue de ¾ par dessous.

Cette espèce est bien caractérisée par la structure du clypéus et par la sculpture des mésopleures.

Oxybelus deserticola sp. n. *c*: Laghouat, v, 1 ♂ (type); j'ai vu aussi un ♂ de Tripolitaine: Tunis, x, 1936 (G. Scortecci), appartenant au Musée de Milan.

♂. 5,5–6 mm. Mandibules jaune clair, la pointe ferrugineuse et noire; scapes ferrugineux clair, obscurcis sur leur face supérieure seulement ou aussi au milieu de leur face antérieure; funicules ferrugineux, plus ou moins obscurcis à l'extrémité. Les dessins du corps sont d'un ferrugineux clair, tirant sur le rosé, et comprennent: le collare et les tubercules huméraux, deux grandes taches sur le scutellum, la partie interne des lamelles et parfois une bande entre celles-ci, les bords latéro-postérieurs du scutellum et du postscutellum, le fond du mucron, 2 taches triangulaires, se touchant presque par leur pointe, sur le 1er tergite, des bandes assez étroites (la 1ère un peu interrompue) sur les tergites 2–5. Sont de cette même couleur sur les pattes; une tache à l'extrémité de la face inférieure des fémurs 1 et 2, la face antérieure des tibias 1 et 2, la base des tibias 3, les tarses. Plaques précostales uniformément claires, nervures brunes.

La tête, vue de face, est large; la largeur d'un œil est égale à la moitié de celle du front (fig. 40). Pointe médiane du clypéus courte, terminant une carène qui, vue de profil, est régulièrement et faiblement arquée; les pointes latérales sont aplaties en lames, obliquement tronquées à l'extrémité. Ponctuation de la face fine et dense; tête bien développée en arrière des yeux, comme chez *pugnax* Olivier. Mésonotum à ponctuation très dense, réticulé; scutellum à ponctuation assez forte, un peu plus espacée (les espaces montrant une ponctuation microscopique), portant une carène médiane continue et quelques courtes stries dans sa partie postérieure; mésopleures fortement réticulées, leur partie inférieure avec quelques fortes carènes verticales sinueuses; mésosternum avec une ponctuation fine et obsolète. Postscutellum avec une carène médiane et 1–2 carènes longitudinales de chaque côté; les lamelles faiblement bifides à l'extrémité; mucron en gouttière assez large, portant au fond quelques stries transversales, s'élargissant vers l'extrémité, qui est échancrée. La ponctuation des tergites est nettement double, ce que l'on voit particulièrement sur le 2e; sur un fond microscopiquement ponctué se montrent des points plus gros, quoique encore fins, séparés par des espaces plus grands qu'eux-mêmes; le 2e sternite montre aussi, sur un fond microscopiquement ponctué, quelques points un peu plus gros, isolés; tergites avec des pointes latérales. Métatarse 1 avec 4–5 épines, l'apex de la première atteignant presque l'extrémité du 2e article; métatarses 2 avec 1–2 épines sur leur face dorsale. Pilosité de la tête et du thorax argentée, tout à fait couchée, relativement peu développée.

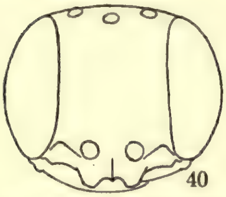


FIG. 40. *Oxybelus deserticola* sp. n., ♂, tête vue de face.

L'espèce est caractérisée par la forme du clypéus, la ponctuation du mésonotum et des tergites.

Oxybelus subspinosus Klug. *a*: Tagramaret, 5 ♂. *c*: Laghouat, vi, 1 ♂; Tadjemout, 1 ♂, 1 ♀.

Pour cette espèce et la suivante: voir Verhoeff (1948).

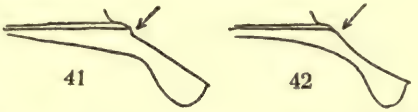
Oxybelus fischeri Spinola (= *africanus* Kohl). *c*: Tadjerouna, 6 ♀.

Oxybelus lubricus sp. n. *c*: Aflou, 1 ♀ (type), 1 ♂.

Espèce voisine de *mucronatus* Fabricius (= 14—*notatus* Jurine), ayant aussi des rapports avec *subspinosus* Klug et *fischeri* Spinola.

♀. 5 mm. Mandibules d'un jaunâtre ferrugineux, la pointe obscure; bord antérieur du clypéus, une tache à l'extrémité du scape, la face inférieure du funicule et sa face supérieure à l'extrémité, ferrugineux; sont d'un jaune un peu blanchâtre: 2 taches, se touchant presque au milieu, sur le collare, les tubercules huméraux, 2 taches sur le scutellum et 2 sur le postscutellum, entre les lamelles, le bord interne de celles-ci, les bords latéro-postérieurs du scutellum et du postscutellum, des taches latérales, largement séparées au milieu, sur les tergites 1–4, celles du tergite 2 très étroites sur les côtés, légèrement élargies à leur extrémité interne, celles des tergites 3–4 très étroites; sont ferrugineux: les tergites 5 et 6, les parties latérales du tergite 4 et des taches latérales plus petites sur les tergites précédents; tegulae transparentes avec une tache jaunâtre; plaque précostale et nervulation à la base de l'aile antérieure entièrement ferrugineux clair. Fémurs noirs, ceux des 2 premières paires avec une grande tache blanche à la face inférieure; tibias et tarses ferrugineux clair; une strie jaune, atteignant presque l'extrémité, sur tous les tibias.

Les proportions des diverses parties de la tête sont celles de *mucronatus*, c'est à dire que la largeur minimum du front est à peine supérieure à celle d'un œil (10 : 8); bord antérieur du clypéus comme chez *mucronatus*; vue de profil, la moitié inférieure du clypéus forme une ligne peu concave, avec le « nez » peu saillant ; ponctuation de la face et du vertex plus forte et plus espacée que chez *mucronatus* ; entre les ocelles, par exemple, les espaces sont plus grands que les points ; sur les tempes aussi, la ponctuation est plus espacée que chez *mucronatus*. Il existe sur le collare un caractère assez subtil, dont je ne puis garantir la constance ou la valeur spécifique : chez *mucronatus*, comme chez la plupart des espèces, la carène antérieure du collare est légèrement interrompue ou tout au moins nettement anguleuse sur les côtés (fig. 41) ; chez *lubricus*, au même endroit, la carène est régulièrement courbée (fig. 42). Mésonotum à ponctuation plus forte et plus espacée que chez *mucronatus* ; sur le disque et dans la partie postérieure, les espaces sont en moyenne aussi grands que les points ; bord postérieur avec une série de courtes carènes longitudinales très nettes ; ponctuation du scutellum comme celle du mésonotum ; postscutellum large entre les lamelles, avec 7 carènes parallèles, la médiane plus forte ; lamelles nettement bifides à l'extrémité, le lobe supérieur, vu par dessus, cachant la pointe inférieure ; mucron étroit, moins allongé qu'il ne l'est généralement chez *mucronatus*, nettement échancré à l'extrémité ; mésopleures plus brillantes que chez *mucronatus*, entièrement et assez régulièrement réticulées, sans fortes stries ; mésosternum très brillant, avec une ponctuation très fine et très espacée (les espaces beaucoup plus grands que les points), à peu près comme chez *fischeri* ; faces latérales du propodéum très brillantes, avec des stries longitudinales dans le haut et en arrière ; la ponctuation des tergites abdominaux et du 2e sternite est intermédiaire entre celle de *mucronatus* et celle de *fischeri*, moins serrée et plus forte que chez le premier, mais un peu moins espacée et moins forte que chez le deuxième ; aire pygidiale un peu plus large et plus brillante que chez *mucronatus* ; peigne court, comme chez cette espèce ; métatarse 2 n'ayant d'épines qu'à l'extrémité. Pilosité peu développée, ne cachant la sculpture que sur le bas de la face ; sur le mésonotum, elle est très fine et tout à fait couchée.



FIGS. 41–2. *Oxybelus mucronatus* Fabricius et *lubricus* sp. n., ♀, moitié droite du collare, vue par dessus. 41. *mucronatus*. 42. *lubricus*.

♂. 3,5 mm. Coloration comme chez la femelle, avec les différences suivantes : postscutellum entièrement jaune entre les lamelles ; les taches du 1er tergite sont moins largement séparées, celles des tergites 2–4, étroites, sont réunies au milieu par une strie ferrugineuse ; sur le 5e tergite, il y a aussi une étroite bande jaune et ferrugineuse ; tergites 5 et 6 ferrugineux ; tibias en grande partie jaunes.

Morphologiquement, le mâle se distingue de *mucronatus* par les mêmes caractères de structure et de sculpture que la femelle : tergites avec des pointes latérales ; côtés rabattus du 7e tergite peu développés ; pas de pilosité particulière aux sternites ; peigne court.

Cette espèce se distingue donc de *mucronatus* par sa ponctuation plus espacée, caractère particulièrement évident sur le mésosternum ; d'autre part, les dessins jaunes sont moins développés sur l'abdomen et les deux derniers tergites sont ferrugineux ; les tibias de la femelle n'ont pas de taches noires ; les plaques précostales sont entièrement claires. Ces particularités peuvent paraître peu importantes, mais il ne faut pas oublier que, dans ce groupe d'*Oxybelus*, les différences morphologiques sont faibles et que la sculpture et la coloration sont très constantes chez *mucronatus*, que l'on rencontre d'autre part dans la région habitée par *lubricus*. Par sa sculpture et sa coloration, l'espèce est voisine de *subspinosus* et de *fischeri*, mais s'en distingue par sa taille plus faible, la face plus étroite, le clypéus de forme légèrement différente, le mucron plus long et plus étroit, les derniers segments ferrugineux. On ne pourra guère la confondre avec *pugnax* Olivier et *dissectus* Dahlbom, qui sont de plus grande taille, ont une pilosité dressée sur le mésonotum, les mandibules et l'extrémité de l'abdomen foncées et une sculpture différente, ni avec *variegatus* Wesmael, qui a la face plus large, une ponctuation beaucoup plus espacée et un postscutellum beaucoup plus étroit.

Oxybelus mucronatus Fabricius (= 14—*notatus* Jurine). *c*: Aflou, 2 ♂, 1 ♀; Laghouat, vi, 4 ♀; Aïn Madhi, 2 ♂.

Oxybelus pugnax moricei ssp. n. *a*: Tagramaret, 1 ♀. *c*: Aflou, 1 ♂; Taouiala, 1 ♀; Laghouat, 1 ♂, 2 ♀; Tadjemout, 3 ♂, 2 ♀.

Tous les exemplaires nord-africains que j'ai pu examiner, y compris une partie de ceux que cite Morice (1911), appartiennent à une forme qui, par sa coloration tout au moins, se distingue nettement de la forme typique européenne.

Chez les *pugnax* d'Europe, l'étendue des dessins jaunes varie beaucoup et l'on peut trouver des femelles sans traces de dessins jaunes et d'autres chez lesquelles cette couleur envahit la plus grande partie de l'abdomen. Les taches du 2ᵉ tergite, lorsqu'elles ne sont pas très réduites, sont toujours larges (dans le sens longitudinal de l'insecte!); chez les exemplaires à 5 paires de taches, par exemple, elles occupent souvent plus de la moitié de la longueur du segment. De plus, chez les deux sexes, les dessins sont d'un beau jaune doré.

Chez les spécimens nord-africains, l'étendue des dessins clairs sur l'abdomen varie aussi, mais les taches du 2ᵉ tergite sont toujours linéaires, n'occupant qu'une étroite zone au bord postérieur du segment. Les dessins clairs, sur le reste du corps, sont en moyenne peu développés; il apparaît rarement des taches sur le scutellum du mâle, les fémurs de la femelle sont généralement noirs, ceux du mâle avec de petites taches apicales seulement. Mais, ce qui contribue surtout à donner à cette sous-espèce nord-africaine son aspect particulier, c'est que les dessins, chez la femelle, sont d'un blanc-jaunâtre et non jaune doré; chez le mâle, par contre, les différences de teinte entre les individus d'Europe et ceux d'Afrique sont peu marquées, le jaune étant cependant un peu moins intense chez les individus africains. Je n'ai pas remarqué de différences constantes dans la coloration entre les deux races.

J'ai étudié un grand nombre d'exemplaires d'Algérie (Hippône, Biskra) et du Maroc (Marrakech, Beni Mellal, Agadir, Tiznit, Ksar es Souk, etc.).

Les exemplaires de la collection Guichard n'étant pas en très bon état, je désigne comme type une femelle de Biskra (ma coll.).

Oxybelus dissectus tingitanus ssp. n. *b*: Tassiala, 1 ♀.

Oxybelus dissectus Dahlbom (= *monachus* Gerstaecker) est représenté au Maroc par une race assez distincte. Comparés aux *dissectus* d'Europe centrale, les spécimens marocains s'en distinguent tout d'abord par une taille plus grande, les ailes plus enfumées et leur sculpture plus forte: la réticulation des mésopleures est plus accusée, la ponctuation des tergites plus forte et plus serrée, avec des espaces presque partout plus petits que les points; on peut noter qu'au point de vue de la sculpture, les individus de l'Europe méridionale (Italie) sont intermédiaires entre les deux races. Chez les spécimens marocains, la ponctuation de la partie inférieure des tempes est plus dense, avec, chez les femelles surtout, une pilosité plus développée; le mucron semble en moyenne un peu plus large et plus court. En ce qui concerne le dessin, on peut remarquer que chez les femelles, les taches abdominales, d'un blanc-jaunâtre comme chez les individus d'Europe, sont en général éloignées de la ligne médiane et assez larges. Chez les mâles, les dessins sont aussi du même jaune que chez les individus européens et en moyenne très développés; tous les exemplaires examinés ont une bande, légèrement interrompue au milieu, au collare, les tubercules huméraux, 2 taches au scutellum, parfois une partie du postscutellum jaunes; les taches du 2ᵉ tergite ont tendance à s'élargir, celles des fémurs 1 et 2 à prendre une assez grande extension. Chez les *dissectus* mâles d'Europe, les taches du 2ᵉ tergite sont généralement linéaires et celles des fémurs peu développées; on observe donc ici un phénomène inverse de celui que nous avons noté chez *pugnax*!

Oxybelus dissectus tingitanus et *pugnax moricei* ayant des dessins de même couleur sont plus difficiles à distinguer au premier abord que les sous-espèces typiques d'Europe. Outre les différences déjà signalées dans l'extension des dessins et la forme des taches du 2ᵉ tergite, on peut noter que le 1ᵉʳ se distingue du 2ᵉ par la ponctuation et la pilosité plus abondantes de la partie tout à fait inférieure des tempes, la ponctuation plus nette de la base du labium et des maxilles, les épines des pattes (peigne en particulier) plus longues, la pilosité du mésonotum plus longue et plus dressée et quelques détails de sculpture difficiles à apprécier sans matériel de comparaison. M. Verhoeff m'a encore signalé une différence dans la forme du clypéus du mâle. Chez *pugnax*, la dent médiane est plus mince, avec un profil inférieur régulièrement concave; chez *dissectus*, la dent est plus épaisse et le bord inférieur, vu de profil, montre un petit tubercule, ce qui fait paraître la pointe plus ou moins bifide.

J'ai vu des spécimens de diverses localités du Maroc: Port Lyautey, Fedalah, Casablanca, Tiznit, Goulimine (coll. Naef, ma coll.). Nadig (1933) cite *monachus* de Goundafa et Giner Mari (1945) du Maroc espagnol. Type: 1 ♀ de Port Lyautey (Mehdia) 26.v.47 (ma coll.).

Oxybelus aurantiacus Mocsáry. *c*: Laghouat, v, 1 ♀.

L'individu de la collection Guichard, ainsi que d'autres spécimens du Maroc, ne m'ont pas paru différer de façon sensible de ceux de l'Europe méridionale.

Oxybelus victor Lepeletier. *a*: Maison Carrée, iv.43, 1 ♂.

Oxybelus bipunctatus thermophilus ssp. n. *c*: Laghouat, vi, 4 ♀ (dont le type). Autres exemplaires étudiés, du Maroc: Marrakech, 11–15.v.47; Tafraout (Anti-Atlas), 30.iv.47; Goulimine, 4.v.47; 12 ♂, 4 ♀ (ma coll.). Morice (1911) cite 1 ♂ de *bipunctatus* de Biskra; il s'agit probablement de la forme décrite ci-dessous.

Les individus nord-africains présentent toutes les caractéristiques principales des *bipunctatus* Olivier d'Europe: ponctuation espacée de la face et du mésonotum, structure du postscutellum et du mucron, peigne du tarse antérieur formé de très longues épines, coloration jaune très peu développée sur le thorax, etc. Ils s'en distinguent par la taille en moyenne plus faible (♂: 3,5–4 mm., ♀♂ 4–5 mm.), le lobe interne des lamelles peu développé, la sculpture, les reflets bronzés de l'abdomen très réduits, la coloration jaune plus développée.

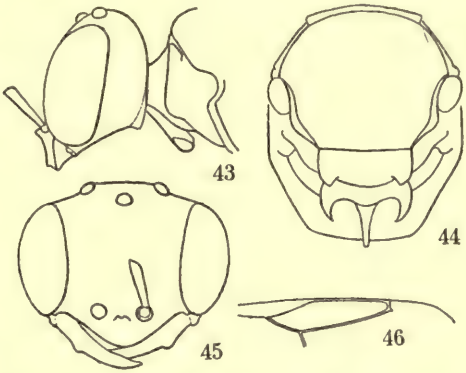
Comme chez les individus d'Europe, la sculpture du thorax présente de notables variations individuelles; c'est surtout sur la face dorsale de l'abdomen que l'on remarque une différence constante; chez *b. thermophilus* ♀, en effet, les tergites montrent une ponctuation fine et espacée (les espaces un peu plus grands que les points), mais très nette, tandis que chez *b. bipunctatus* ♀, les tergites sont très brillants, avec des points microscopiques très espacés; chez les mâles aussi, la ponctuation des tergites est plus forte. Mandibules de couleur variable; chez tous les spécimens examinés, les tubercules huméraux et les lamelles du postscutellum sont jaunes; un mâle a de petites taches au collare. Les femelles ont de grandes taches sur le 1^er^ tergite, une étroite bande terminale sur le 5^e^ tergite et, la plupart d'entre elles, d'étroites taches latérales sur les tergites 2 à 4; aire pygidiale d'un ferrugineux clair. Les mâles ont au plus des taches sur les tergites 1–4; ils sont donc proportionnellement moins tachés que les femelles. Chez les 2 sexes, les tibias et les tarses sont jaunes, plus ou moins tachés de ferrugineux; les tibias sont tout au plus tachés de noirâtre sur leur face postérieure.

Belomicrus Costa

Belomicrus patei sp. n. *c*: Laghouat, vi, 2 ♀ (dont le type); Tadjemout, 1 ♀.

♀. 5–5,5 mm. Mandibules jaunâtres, à pointe foncée; bord antérieur du clypéus, face inférieure du funicule et tubercules huméraux d'un ferrugineux sombre; les premiers tergites plus ou moins ferrugineux en avant des dépressions terminales, qui sont jaunâtres; dernier segment abdominal ferrugineux; tegulae transparentes; ailes hyalines, à nervulation d'un jaune très pâle. Fémurs 1 noirs, avec l'extrémité jaune; tibias et tarses 1 jaunes; fémurs 2 et 3 noirs avec l'extrémité ferrugineuse; tibias 2 et 3 ferrugineux, avec la base jaune; tarses 2 et 3 ferrugineux et jaunes.

Bord inférieur des mandibules avec un petit lobe à leur $\frac{1}{3}$ basal; pas de dents au bord interne; clypéus (fig. 45) peu bombé, son bord antérieur régulièrement arqué, sa base, entre les insertions antennaires, soulevée en une petite lamelle échancrée, le tiers apical de sa partie médiane lisse et brillant, le reste de sa surface à ponctuation très fine et pas très serrée; insertions antennaires un peu plus proches l'une de l'autre que du bord interne des yeux (5 : 6); scapes égalant la moitié de la largeur de la face; articles 2 et suivants du funicule un peu plus longs que larges; yeux à facettes fines sur toute leur surface, leurs bords internes très peu convergents vers le bas; face un peu plus large que la distance séparant les insertions antennaires de l'ocelle antérieur, sans ligne médiane, à ponctuation très fine et dense dans le bas, un peu moins fine dans le haut, où les espaces sont presque aussi grands que les points; deux zones lisses et brillantes derrière les scapes; vertex à ponctuation plus espacée que la face; distance interocellaire : distance oculo-ocellaire = 5 : 2; carènes temporales très développées dans le bas, où elles forment un lobe transparent (fig. 43). Collare, vu par dessus (fig. 44), étroit, formant de chaque côté un angle saillant d'où se détache de chaque côté une forte carène, descendant sur les propleures; prosternum lisse et brillant; mésonotum assez fortement soulevé en lame sur ses bords latéropostérieurs; sa surface brillante, à ponctuation moyenne, espacée (les espaces presque partout plus grands que les points); scutellum ponctué comme le mésonotum, à bords latéraux soulevés en lames qui se terminent en arrière par un lobe pointu (fig. 44); postscutellum rugueux, transverse, avec des lamelles falciformes transparentes; mucron creusé en gouttière, son extrémité étroitement arrondie. Mésopleures brillantes, à ponctuation fine et espacée (les espaces beaucoup plus grands que les points); la suture épimérale très forte, crénelée; la suture horizontale très nette aussi; aires épicnémiales limitées par une carène très nette, débutant en haut en arrière des tubercules huméraux, sa partie inférieure se recourbant en arrière et venant rejoindre une carène, très nette aussi, située en avant des hanches 2; mésosternum brillant, à ponctuation très fine et assez dense, avec une carène longitudinale médiane n'atteignant pas son bord antérieur. Propodéum assez mat, avec une microréticulation de base et des carènes bien marquées; l'aréole médiane de la face postérieure est sculptée comme le reste de la surface, pointue en bas, indistinctement limitée en haut. Tergites abdominaux brillants, à ponctuation très fine et peu dense (les espaces plus grands que les points), leur partie basale fortement déprimée; aire pygidiale fortement ponctuée, étroitement arrondie à l'extrémité; sternites assez fortement convexes, surtout chez 2 des 3 individus examinés, brillants, avec quelques points. Cellule radiale assez fortement tronquée à l'extrémité (fig. 46). Fémurs antérieurs régulièrement convexes sur leur face inférieure, sans carène au bord antérieur; peigne formé d'épines très fines; les articles des tarses 1, surtout le 1er, fortement dyssymétriques à l'extrémité; toutes les épines des pattes sont longues et fines. Pilosité peu développée, argentée sur la face; psammophores relativement peu développés, formés de soies peu rigides.



FIGS. 43–6. *Belomicrus patei* sp. n., ♀. 43. Tête et prothorax, vus de profil. 44. Thorax, face dorsale. 45. Tête vue de face. 46. Cellule radiale.

B. patei se distingue de toutes les autres espèces paléarctiques par la structure de son scutellum, qui semble la rapprocher de *B. rhodesianus* Arnold, de l'Afrique du sud. Par le développement des carènes des mésopleures, il ressemble à *B. stecki* Kohl et *B. kohlianus* Schulthess, mais s'en distingue très facilement par la taille plus faible, les yeux peu convergents, la structure du clypéus, etc. Je dédie cette espèce à Monsieur V. S. L. Pate, auteur de nombreux et beaux travaux sur les Sphecidae, et en particulier sur les *Belomicrus*.

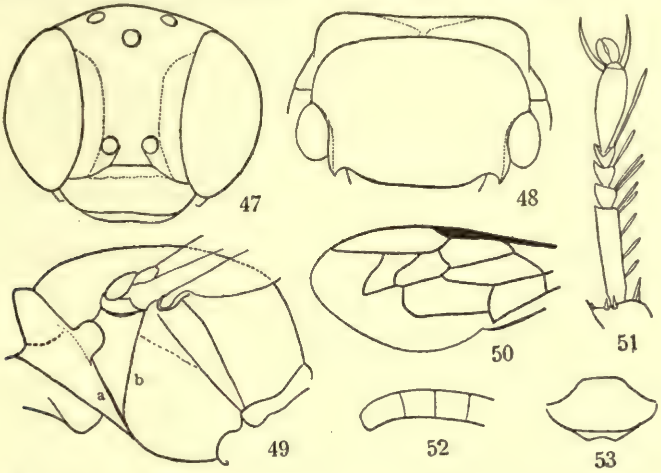
APPENDICE

Je décris ici un intéressant Sphégide du Maroc, qui ne fait pas partie de la collection de M. Guichard, mais qui m'a été transmise en même temps que celle-ci par M. Benson.

Gorytes (subgen. ?) *bensoni* sp. n.

♀. 6,5–7 mm. Mandibules jaunes, la pointe ferrugineuse et noire; labre et bord antérieur du clypéus ferrugineux; sont d'un jaune-blanchâtre: le clypéus (sauf sa partie supérieure), des bandes au bord interne des yeux, le collare (plus ou moins ferrugineux, ou même noirâtre sur les côtés), les tubercules huméraux, une tache quadrangulaire occupant le haut des épimères mésothoraciques, une bande au bord postérieur du scutellum, le postscutellum, 2 taches latérales sur le 1^er^ tergite, des bandes, élargies latéralement, sur les tergites 2–5, les 2 premières généralement interrompues; extrémité de l'aire pygidiale ferrugineuse. Scapes jaunes avec une grande tache noire sur leur face supérieure; funicule ferrugineux; tegulae jaune clair en avant, ferrugineuses en arrière; ailes légèrement enfumées sur toute leur surface, la nervulation d'un brun foncé; pattes ferrugineuses, avec les zones suivantes d'un jaune blanchâtre: une tache à l'extrémité des fémurs 1 et 2, en dessous, la face antérieure des tibias 1 et 2, une tache à la base des tibias 3, une partie des tarses.

Tête, vue de face, plus large que haute, avec les bords internes des yeux divergeant en haut et en bas (fig. 47); la partie antérieure des yeux avec des facettes grossières, beaucoup plus grandes que celles de la partie postérieure; mandibules simples, non dentées au bord interne; labre peu saillant, mat, à ponctuation forte et dense; clypéus brillant avec quelques gros points isolés, son bord antérieur avec une large lamelle, légèrement échancrée au milieu, sa partie tout à fait supérieure, ainsi que l'écusson frontal, à ponctuation fine et dense; antennes peu épaissies vers l'extrémité; 2^e^ article du funicule 2 fois plus long que large, le 3^e^ légèrement plus court; front à ponctuation très fine et très dense, presque sans espaces entre les points; vertex brillant, à ponctuation fine aussi, mais très espacée; ocelles en angle obtus, les postérieurs à peu près 2 fois plus éloignés entre eux que du bord interne des yeux; tête assez largement arrondie derrière les yeux, les tempes bien développées. Collare de forme particulière, très épais lorsqu'on l'examine par dessus, tombant verticalement en avant (fig. 48 et 49); mésonotum brillant, avec des points très espacés, de dimensions variées; dans la partie tout à fait antérieure et le long des sillons parapsidaux internes, il y a de plus une ponctuation fondamentale microscopique; les bords latéraux sont soulevés en lamelles qui se terminent en pointe à l'extrémité; ils ne présentent pas la courte carène transversale que l'on remarque chez divers groupes de *Gorytes*; suture entre le mésonotum et le scutellum simple, non crénelée; scutellum brillant, avec des points très espacés. Mésopleures brillantes, avec une ponctuation moyenne, très nette, espacée (les espaces en moyenne plus grands que les points, beaucoup plus grands que ceux-ci sur les épimères); aires épicnémiales limitées par d'assez faibles carènes (fig. 49, *a*), qui disparaissent en haut au milieu des épimères, n'atteignant pas en bas le milieu du mésosternum et ne se continuant pas vers les hanches 2; la partie supérieure des mésopleures ne présente pas le relief compliqué que l'on voit généralement chez les *Gorytes*; épimères très larges en haut, limités par une suture très nette (fig. 49, *b*); suture épisternale faiblement indiquée; partie antérieure du mésosternum présentant au milieu une carène courte, très saillante, anguleuse; métapleures à ponctuation microscopique et espacée. Propodéum court, tombant presque verticalement en arrière; son aire dorsale grande, se prolongeant en une longue pointe sur la face postérieure, entièrement lisse et brillante, sans sillon médian; le reste du propodéum avec une ponctuation fine et nette, moyennement serrée (les espaces à peu près égaux aux points), s'effaçant dans la partie antérieure des faces latérales, qui est lisse et brillante. Abdomen, vu par dessus, régulièrement rétréci en avant et en arrière, le premier segment n'étant pas étranglé à sa jonction avec le 2e; tergites mats, à ponctuation fine et assez dense (les espaces par endroits plus grands, à d'autres plus petits que les points); aire pygidiale mate, avec une microponctuation de base et des points assez gros et assez serrés, portant quelques soies couchées dans sa partie postérieure; sternites à ponctuation plus forte et plus espacée que les tergites; le 2e, vu de profil, à peine convexe. Nervulation (fig. 50): aux ailes antérieures, la 2e cellule cubitale est longue, la 3e rétrécie au milieu de sa hauteur; nervulus interstitiel; aux ailes postérieures, la nervure cubitale se détache très loin après l'extrémité de la cellule anale. Fémurs assez courts et renflés; tibias 2 et 3 avec d'assez nombreuses épines, courtes; le 5e article des tarses antérieurs est presque aussi long que le 1er (fig. 51), les articles intermédiaires courts; peigne bien développé, formé d'épines aplaties; celle qui est à l'extrémité du 4e article est beaucoup plus longue que les autres; aux pattes 2, le 5e article des tarses est également très allongé, presque aussi long que le 1er; aux pattes postérieures, les proportions sont plus normales: le 5e article est plus court que les 2 précédents réunis. La pilosité est très peu développée; sur les côtés de la face et du clypéus et à la base de ce dernier existe une pilosité argentée, courte et couchée.



FIGS. 47–53. *Gorytes bensoni* sp. n. 47. ♀, tête vue de face. 48. ♀, face dorsale du thorax. 49. ♀, face latérale du thorax. 50. Aile antérieure. 51. ♀, tarse antérieur. 52. ♂, extrémité de l'antenne. 53. ♂, clypéus.

♂. 5,5–6,5 mm. Les dessins du corps sont un peu plus étendus que chez la femelle, ceux du thorax et de l'abdomen d'un jaune plus franc; le clypéus, l'écusson frontal et le collare sont entièrement jaunes; tache des épimères plus grande; scutellum avec une bande plus large et 2 petites taches à ses angles antérieurs; bandes des tergites 1–5 un peu plus larges; 6ᵉ et 7ᵉ tergites sans taches jaunes, en partie ferrugineux; sur les pattes aussi, les taches sont d'un jaune plus franc et plus grandes que chez la femelle.

Structure et sculpture comme chez la femelle, avec les différences suivantes: l'échancrure du bord antérieur du clypéus est moins large et plus nette (fig. 53); les facettes de la partie antérieure des yeux sont beaucoup moins grossières; 2ᵉ article du funicule 1½ fois aussi long que large, plus long que le 3ᵉ; le dernier article est légèrement courbé et tronqué à l'extrémité (fig. 52); 7ᵉ tergite aplati, nettement rétréci en arrière, à ponctuation dense; bord postérieur des sternites 3 et 4 portant dans leur partie médiane une rangée serrée de poils dressés; le dernier article des tarses 1 et 2 est proportionnellement plus court que chez la femelle égalant à peu près les ⅗ du métatarse; tarses antérieurs sans peigne véritable, mais avec quelques fines et courtes épines.

Si l'on conserve le genre *Gorytes* dans son sens large, tel que le concevait Handlirsch, par exemple, à quel sous-genre ou groupe d'espèces faut-il rattacher cette espèce? Je ne puis répondre pour l'instant à cette question.

Par l'absence de carènes à la partie inférieure des mésopleures, la suture simple entre le mésonotum et le scutellum, la forme du propodéum et de son aire dorsale, la nervulation des ailes postérieures, *G. bensoni* se rapproche évidemment des sous-genres *Kaufmannia* Radoszkowski, représenté par l'espèce *maracandicus* Radoszkowski, de l'Asie occidentale et centrale, *Olgia* Radoszkowski, représenté par *modestus* Radoszkowski, de l'Asie centrale, et *Clytemnestra* Spinola, qui comprend des espèces américaines.

Je ne connais malheureusement les deux premiers de ces groupes que par les descriptions, insuffisantes à certains points de vue. On peut cependant dire que *bensoni* se distingue de *maracandicus* et de *modestus* par son collare plus développé, du 1ᵉʳ par la face plus étroite, avec des yeux plus convergents, du 2ᵉ par son abdomen régulièrement ovoïde. Comparé à une femelle de *bipunctatus*, qui fait partie du groupe *Clytemnestra*, *bensoni* s'en distingue par le collare dilaté, la partie supérieure des mésopleures plus plate, l'aire dorsale du propodéum entièrement lisse et sans sillon médian, le 1ᵉʳ tergite non étranglé à sa jonction avec le 2ᵉ, la présence d'un peigne au tarse antérieur, le dernier article des tarses 1 et 2 plus long.

De nouvelles études montreront si *bensoni* peut se rattacher à l'un des sous-genres déjà existants ou s'il doit être placé dans un groupe nouveau.

J'ai étudié 3 mâles et 5 femelles, appartenant au British Museum et étiquetés: « Mogador district, S.W. Morocco (Escalera) »; un mâle porte une 2ᵉ étiquette: « Marruecos. Mogador xii.1906. Escalera » et 1 mâle, 1 femelle: « Marruecos, Marrakesh iv.1907. Escalera ». J'ai désigné une femelle comme type. C'est avec plaisir que je dédie cette espèce à M. R. B. Benson, bien connu pour ses travaux sur les Tenthredinides, qui a mis à ma disposition les Sphégides de la collection Guichard, ainsi que bien d'autres Hyménoptères intéressants appartenant aux collections du British Museum.

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